JUNIPER NETWORKS

RingMaster™

Monitoring and Management Guide

Release

7.4

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About This Guide

RingMaster 7.4 Management Guide

This guide is part of a Publications Suite intended for network administrators or persons responsible for installing and managing a Wireless Local Area Network (WLAN) using *RingMaster* software. It provides detailed procedures for managing a Wireless Local Area Network (WLAN) using *RingMaster* software. As described in detail in the *RingMaster Quick Start Guide*, you install *RingMaster Services* and *RingMaster Client* software on selected hosts. You start using *RingMaster Services* (as described below) on a host and a *RingMaster Client* on the same or a different host to begin management of your WLAN.

RingMaster Publication Suite

The following documents provide information on how to install *RingMaster* software and then use it to plan, configure, and manage a WLAN.

Publications that make up the *RingMaster* Publication Suite are:

- *RingMaster Quick Start Guide* — This guide provides a description of prerequisites and procedures required to install and begin using *RingMaster* software. Information is provided about system requirements for optimum performance, as well as how to install *RingMaster Client* and *RingMaster Services* software.
- *RingMaster 7.1 Planning Guide*— This guide provides instructions for planning a WLAN with the *RingMaster* tool suite.It describes *RingMaster* planning tools. It is intended for network administrators or persons responsible for planning a WLAN using *RingMaster* software.
- *RingMaster 7.1 Configuration Guide* — This guide provides instructions for configuring a WLAN with the *RingMaster* tool suite. It describes *RingMaster* WLAN configuration tools. It is intended for administrators or persons responsible for configuring a WLAN using *RingMaster* software.
- *RingMaster 7.1 Management Guide* (this document) — This guide is described above.

Mobility System Configuration and Management

RingMaster is used with *Trapeze Mobility System* hardware and software, as described in the following publications:

- *Trapeze Mobility System Software Configuration Guide* — This guide provides instructions for configuring and managing a system using the Trapeze Mobility System Software (MSS) Command Line Interface (CLI).
- *Trapeze Mobility System Software Command Reference* — This publication provides functional and alphabetic reference to all MSS commands supported on MXs and MPs
- *Trapeze Mobility Exchange Hardware Installation Guide* — Instructions and specifications for installing an MX.
- *Trapeze Mobility System Software Quick Start Guide* — Instructions for performing setup of secure (802.1X) and guest (WebAAA™) access, and configuring a Mobility Domain for roaming
- *Trapeze Mobility Point MP-422 Installation Guide* — Instructions and specifications for installing an MP access point and connecting it to an MX.
- *Trapeze Mobility Point MP-620 Installation Guide* — Instructions and specifications for installing the MP-620 access point and connecting it to an MX.
- *Trapeze Regulatory Information* — Important safety instructions and compliance information that you must read before installing Trapeze Networks products

Documentation Conventions

This section describes documentation conventions used by various *RingMaster* publications.

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Safety and Advisory Notices

The following types of safety and advisory notices appear in this guide.

This situation or condition can lead to data loss or damage to the product or other property.

This is a process or procedural tip or other useful suggestion.

This information you should note relevant to the current topic.

This alerts you to a possible risk of personal injury or major equipment problems.

Hypertext Links

Hypertext links appear in Blue.

As an example, this is a link to **Contacting the Technical Assistance Center**.

Illustration Formats

RingMaster software presents a Graphical User Interface (GUI) to its users, consisting of a series of screens, windows, and dialog boxes. In many cases, sample images of these GUI elements have been included in this publication. The *RingMaster* GUI allows you to resize these elements, and this has been done to minimize element illustration sizes in this publication, while retaining all of the information visible in them. This resizing of screens, windows and dialog results in illustrations that may differ in appearance from what you may see on your workstation display.

Whenever possible, *RingMaster* screens, windows and dialog boxes are shown in their entirety, with consistent relative sizes, except where large sizes precludes this, then they are shown as large as possible. In addition to overall screen, window and dialog box resizing, you can adjust columns in tables, etc. to change their appearance. To change these items, move your cursor over a border, column separator, etc. and you will see a “resize” indication (a double ended arrow).

Text and Syntax Conventions

Trapeze guides use the following text and syntax conventions:

Convention	Use
`Monospace text`	Sets off command syntax or sample commands and system responses.
Bold text	Highlights commands that you enter or items you select.
Italic text	Designates command variables that you replace with appropriate values or highlights publication titles or words requiring special emphasis.

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Convention	Use
Bold italic text font	*Bold italic text font* in narrative, capitalized or not, indicates a program name, function name, or string.
Menu Name > **Command**	Indicates a menu item. For example, **File** > **Exit** indicates that you select **Exit** from the **File** menu.
[ ] (square brackets)	Enclose optional parameters in command syntax.
{ } (curly brackets)	Enclose mandatory parameters in command syntax.
| (vertical bar)	Separates mutually exclusive options in command syntax.

For information about Juniper support services, visit http://www.trapezenetworks.com/supportportal/, or call 1-866-877-9822 (in the US or Canada) or +1 925-474-2400 and select option 5.

Juniper Networks sells and services its products primarily through its authorized resellers and distributors. If you purchased your product from an authorized Trapeze reseller or distributor and do not have a service contract with Trapeze Networks, you must contact your local reseller or distributor for technical assistance.

Contacting the Technical Assistance Center

Contact the Juniper Networks Technical Assistance Center (TAC) by telephone, email, or via web support portal.

- Within the US and Canada, call 1-866-TRPZTAC (1-866-877-9822).
- Within Europe, call +31 35 64 78 193.
- From locations outside the US and Canada, call +1 925-474-2400.
- In non-emergencies, send email to support@trapezenetworks.com
- If you have a service contract or are a Trapeze Authorized Partner, log in to http://www.trapezenetworks.com/support portal/ to create a ticket online.

TAC Response Time

TAC responds to service requests as follows:

Contact method	Priority	Response time
Telephone	Emergency	One hour
	Non-emergency	Next business day
Email	Non-emergency	Next business day

Information Required When Requesting Service

To expedite your service request, please have the following information available when you call or write to TAC for technical assistance:

- Your company name and address
- Your name, phone number, cell phone or pager number, and email address
- Name, model, and serial number of the product(s) requiring service
- Software version(s) and release number(s)
- Output of the *show tech-support* command
- Wireless client information
- License levels for *RingMaster™* and *Mobility Exchange™* (MX™) products

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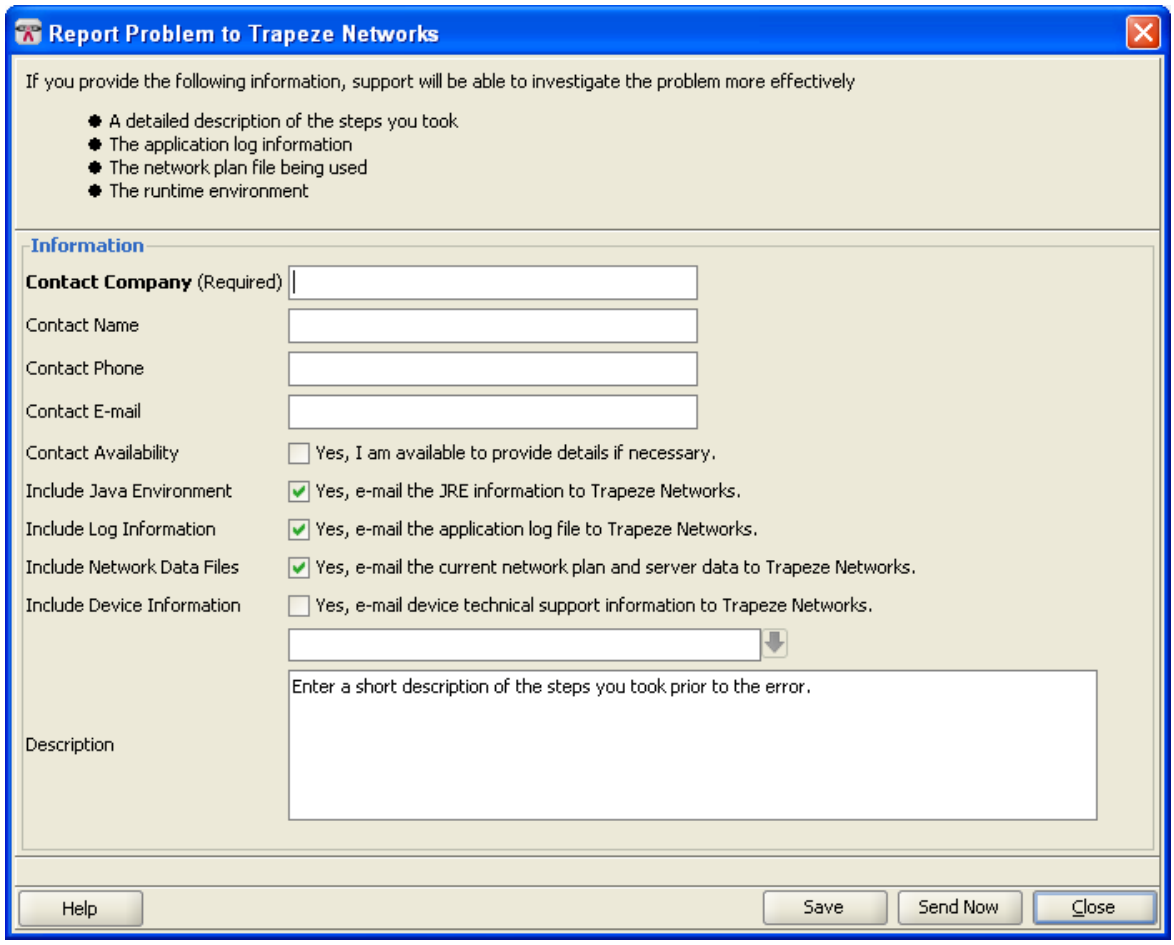
- Description of any problems and status of any troubleshooting effort

Main Menu “Report Problem” Tool

You can click **Help** from the Main menu bar to access online help and to send a report to Trapeze TAC electronically:

1. Select **Help** > **Help** to display HTML help about configuring and using *RingMaster*.
   Select **Help** > **Report Problem** to report a problem to Trapeze Technical Support. This dialog allow you to report problems to Trapeze Networks by filling in particulars and then clicking **Send Now** to compose and send an email to Trapeze.


Report Problem to Trapeze Networks
If you provide the following information, support will be able to investigate the problem more effectively
A detailed description of the steps you took
The application log information
The network plan file being used
The runtime environment
Information
Contact Company (Required)
Contact Name
Contact Phone
Contact E-mail
Contact Availability
Yes, I am available to provide details if necessary.
Include Java Environment
Yes, e-mail the JRE information to Trapeze Networks.
Include Log Information
Yes, e-mail the application log file to Trapeze Networks.
Include Network Data Files
Yes, e-mail the current network plan and server data to Trapeze Networks.
Include Device Information
Yes, e-mail device technical support information to Trapeze Networks.
Description
Enter a short description of the steps you took prior to the error.
Help
Save
Send Now
Close

Warranty and Software Licenses

Current Trapeze Networks warranty and software licenses are available at http://www.trapezenetworks.com/support/warranty.

Limited Warranty for Hardware and Software

TERMS AND CONDITIONS OF SALE

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   Any software provided is licensed pursuant to the terms of Trapeze Networks' Software License Agreement, an electronic copy of which is provided with the Software and a printed copy of which is available upon request. The terms and conditions of the Software License

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Agreement are incorporated herein in its entirety in this Terms and Conditions of Sale ("Terms and Conditions of Sale") by this reference. The terms of the Software License Agreement control, except for the limited warranty set forth below ("Limited Warranty").

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   Trapeze Networks, Inc. ("Trapeze Networks" or "Trapeze") warrants to Customer, subject to the limitation and disclaimer below, that all Trapeze hardware will be free from defects in material and workmanship under normal use as follows: (a) if the hardware was purchased directly from Trapeze Networks, for a period of one (1) year after original shipment by Trapeze Networks to Customer or (b) if the hardware was purchased from a Trapeze Networks Authorized Reseller, for a period of one (1) year from the date of delivery to Customer, but in no event more than fifteen (15) months after the original shipment date by Trapeze ("Limited Hardware Warranty").
   The date of original shipment from Trapeze Networks will be determined by shipping evidence on file at Trapeze Networks. This Limited Hardware Warranty extends only to the Customer who was the original purchaser of the hardware and may not be transferred to any subsequent repurchasing entity. During the Limited Hardware Warranty period upon proper notice to Trapeze Networks by Customer, Trapeze Networks will, at its sole option, either:
   - Repair and return of the defective hardware;
   - Replace the defective hardware with a new or refurbished component;
   - Replace the defective hardware with a different but similar component that contains compatible features and functions; or
   - Refund the original purchase price upon presentation of proof of purchase to Trapeze Networks.

3. Restrictions on the Limited Hardware Warranty.

   This Limited Warranty does not apply if hardware (a) is altered from its original specifications, (b) is installed, configured, implemented or operated in any way that is contrary to its documentation, (c) has damage resulting from negligence, accident, or environmental stress, (d) was subject to unauthorized repair or modification or (e) is provided to Customer for pre-production, evaluation or charitable purposes.

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   Trapeze Networks warrants to Customer, subject to the limitation and disclaimer below, that the software will substantially conform to its published specifications as follows: (a) if the software was purchased directly from Trapeze Networks, for a period of ninety (90) days after original shipment by Trapeze Networks to Customer or (b) if the software was purchased from a Trapeze Networks Authorized Reseller, for a period of ninety (90) days from the date of delivery to Customer commencing not more than ninety (90) days after original shipment date by Trapeze), ("Limited Hardware Warranty"). The date of original shipment from Trapeze Networks will be determined by shipping evidence on file at Trapeze Networks. This Limited Software Warranty extends only to the Customer of original purchaser of the software and may not be transferred to any subsequent repurchasing entity.

   During the Limited Software Warranty period upon proper notice to Trapeze Networks by Customer, Trapeze Networks will, at its option, either:
   - Use reasonable commercial efforts to attempt to correct or provide workarounds for errors;
   - Replace the software with functionally equivalent software; or
   - Refund to Customer the license fees paid by Customer for the software.

   Trapeze Networks does not warrant or represent that the software is error free or that the software will operate without problems or disruptions. Additionally, and due to the steady and ever-improving development of various attack and intrusion technologies, Trapeze Networks does not warrant or represent that any networks, systems or software provided by Trapeze Networks will be free of all possible methods of access, attack or intrusion.

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8. Procedures for Return of Hardware or Software under the Limited Warranty

   Where repair or replacement is required under the Limited Warranty, Customer will contact Trapeze Networks and obtain a Return Materials Authorization number (“RMA Number”) prior to returning any hardware and/or software, and will include the Trapeze Networks RMA Number on all packaging. Trapeze Networks will ship repaired or replacement components within a commercially reasonable time after receipt of any hardware and/or software returned for the Limited Warranty purposes to the address provided by Customer. Customer will pay freight and handling charges for defective return to the address specified by Trapeze Networks and Trapeze Networks will pay freight and handling charges for return of the repair or replacement materials to Customer.

9. Miscellaneous

   The Limited Warranty shall be governed by and construed in accordance with the laws of the State of California without reference to that State's conflict of laws rules and as if the contract was wholly formed within the State of California. Customer agrees that jurisdiction and venue shall be in Santa Clara County, California. Under no circumstances shall the United Nations Convention on the International Sale of Goods be considered for redress of grievances or adjudication of any warranty disputes that include Trapeze Networks hardware or software. If any provision of these Terms and Conditions of Sale are held invalid, then the remainder of these Terms and Conditions of Sale will continue in full force and effect. Where a Customer has entered into a signed contractual agreement with Trapeze Networks for supply of hardware, software or services, the terms of that agreement shall supersede any terms contained within this Limited Warranty. Customer understands and acknowledges that the terms of this Limited Warranty, as well as material information regarding the form, function, operation and limitations of Trapeze Networks hardware and software will change from time to time, and that the most current revisions will be publicly available at the Trapeze Networks corporate web site (www.trapezenetworks.com).

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1 RingMaster Services

This chapter describes the use of *RingMaster Services* software.

Starting or Stopping RingMaster Services

The method for starting and stopping *RingMaster Services* depends on the platform on which the service is installed:

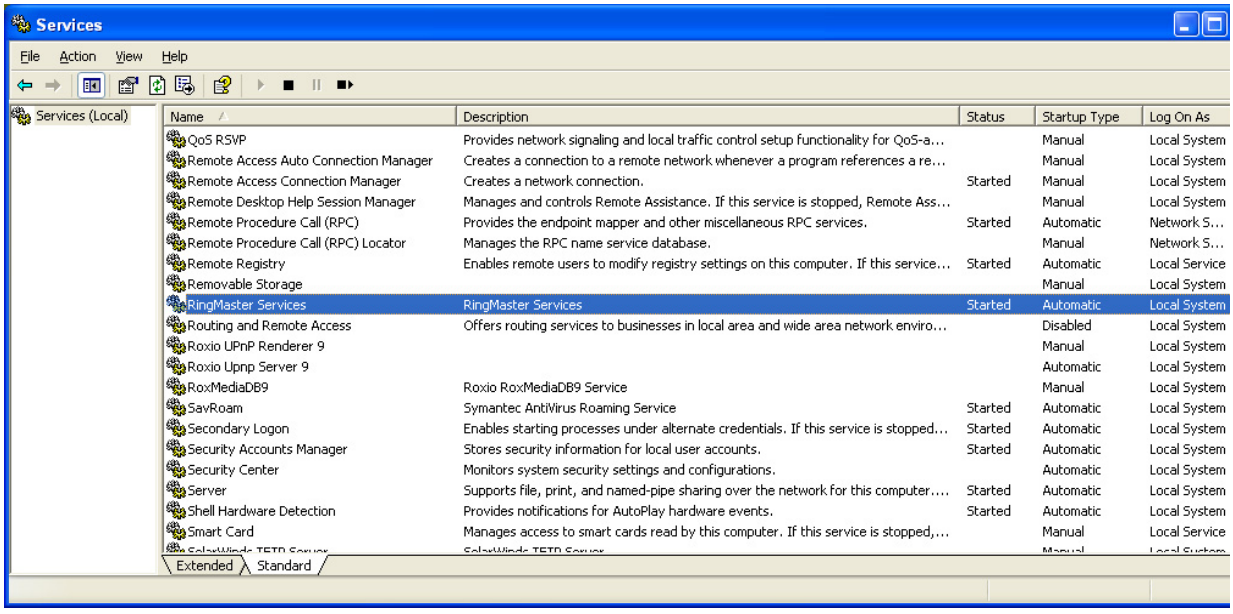
- *Windows* systems — *RingMaster Services* are started automatically when you complete installation and start automatically whenever you restart your system.
- *Linux* systems — You can start and stop these services manually from the command line using a shell script installed when you install *RingMaster Services*. You can configure services to start and stop automatically.
- *Macintosh* systems — *RingMaster Services* are not started automatically — you must start them manually.

All clients using *RingMaster Services* should be closed before you stop services. If a *RingMaster Client* is using a network plan on *RingMaster Services* when you stop the services, you cannot select objects or options in the client. In this case, to close the client, click the **X** in the upper right corner of the window or use Task Manager to end the client session.

Windows Systems

You can start *RingMaster Services* on a *Windows* system from within *RingMaster* or from **Windows Services**.

1. Display the **Services** window. Here is an example of the **Services** window in *Windows*. This is located in **Control Panel > Administrative Tools > Services.** (The window might look different on your system.)


Services
File Action View Help
Services (Local)
Name Description Status Startup Type Log On As
QoS RSVP Provides network signaling and local traffic control setup functionality for QoS-a... Manual Local System
Remote Access Auto Connection Manager Creates a connection to a remote network whenever a program references a re... Manual Local System
Remote Access Connection Manager Creates a network connection. Started Manual Local System
Remote Desktop Help Session Manager Manages and controls Remote Assistance. If this service is stopped, Remote Ass... Manual Local System
Remote Procedure Call (RPC) Provides the endpoint mapper and other miscellaneous RPC services. Started Automatic Network S...
Remote Procedure Call (RPC) Locator Manages the RPC name service database. Manual Network S...
Remote Registry Enables remote users to modify registry settings on this computer. If this service... Started Automatic Local Service
Removable Storage Manual Local System
RingMaster Services RingMaster Services Started Automatic Local System
Routing and Remote Access Offers routing services to businesses in local area and wide area network enviro... Disabled Local System
Roxio UPnP Renderer 9 Manual Local System
Roxio Upnp Server 9 Automatic Local System
RoxMediaDB9 Roxio RoxMediaDB9 Service Manual Local System
SavRoam Symantec AntiVirus Roaming Service Started Automatic Local System
Secondary Logon Enables starting processes under alternate credentials. If this service is stopped... Started Automatic Local System
Security Accounts Manager Stores security information for local user accounts. Started Automatic Local System
Security Center Monitors system security settings and configurations. Automatic Local System
Server Supports file, print, and named-pipe sharing over the network for this computer.... Started Automatic Local System
Shell Hardware Detection Provides notifications for AutoPlay hardware events. Started Automatic Local System
Smart Card Manages access to smart cards read by this computer. If this service is stopped,... Manual Local Service
Extended Standard

2. Scroll down and select *RingMaster Services*.

1.

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3. Select the **Start** or **Stop** item in the **Action** menu item.
4. Close the **Services** window.
5. Within *RingMaster*, enable it to access the service. (See **Connecting a Client to RingMaster Services**.)

Linux Systems

To start *RingMaster Services* manually on a *Linux* system, as the root user, type:

```
prompt# rm-services start
```

To stop *RingMaster* Services manually, type:

```
prompt# rm-services stop
```

These examples assume *RingMaster Services* are installed in the default location.

Macintosh Systems

To start *RingMaster Services* manually on a *Macintosh* system, open a *Terminal* window, either by using the shortcut on the dock, or by browsing to **/Applications/Utilities** and launching *Terminal* from there. In the *Terminal* window, change to the **bin** directory in the *RingMaster* installation directory. By default, this is **/Applications/RingMaster/bin**.

For example:

```
# cd /Applications/RingMaster/bin
```

To start *RingMaster Services*, enter:

```
# sudo ./rm-services start
```

Enter the password, if prompted.

To stop or restart *RingMaster Services*, enter:

```
# sudo ./rm-services stop
# sudo ./rm-services restart
```

Either of these commands may require you to enter a password. These examples assume that *RingMaster Services* is installed in the default location.

Configuring a Daemon on SUSE 9.1

To add services to a SUSE 9.1 installation, use the **insserv** command.

Enter the following commands (as **root**):

```
suse# cd /etc/init.d
suse# ln -s /opt/ringmaster/bin/rm-services rm-services
suse# insserv rm-services
```

Configuring a Daemon on Red Hat WS 3

To add services to a Red Hat WS 3 system, use the *chkconfig* command.

Enter the following (as root):

```
redhat# cd /etc/init.d
redhat# ln -s /opt/ringmaster/bin/rm-services rm-services
redhat# chkconfig --add rm-services
```


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Connecting a Client to RingMaster Services

If a firewall is enabled on the host where you install *RingMaster Services*, *RingMaster Services* will not be able to communicate with *RingMaster Clients* or with MXs unless the firewall is configured to allow through traffic for the SSL and SNMP ports (443 and 162 by default).

To connect to *RingMaster Services*:

1. Start *RingMaster Client*. Do one of the following:
   - On *Windows* systems, select **Start > Programs > Trapeze Networks > RingMaster > RingMaster**, or double-click the *RingMaster* icon on the desktop.
   - On *Linux* systems, change directories to **RingMaster_installation_directory/bin**, and enter **./ringmaster**.
   - On *Macintosh* systems, select **Finder > Applications > RingMaster**, or click the *RingMaster* icon in the dock.

   The **RingMaster Services Connection** dialog appears.

2. Enter the **IP address** or fully-qualified hostname of the server on which the service is installed (if not pre-filled). If the service is installed on the same server as the one you are using to run *RingMaster*, enter **127.0.0.1** as the IP address. This is a standard IP loopback address.
3. Specify the service port, if different from the port number in the **Port** selector list.

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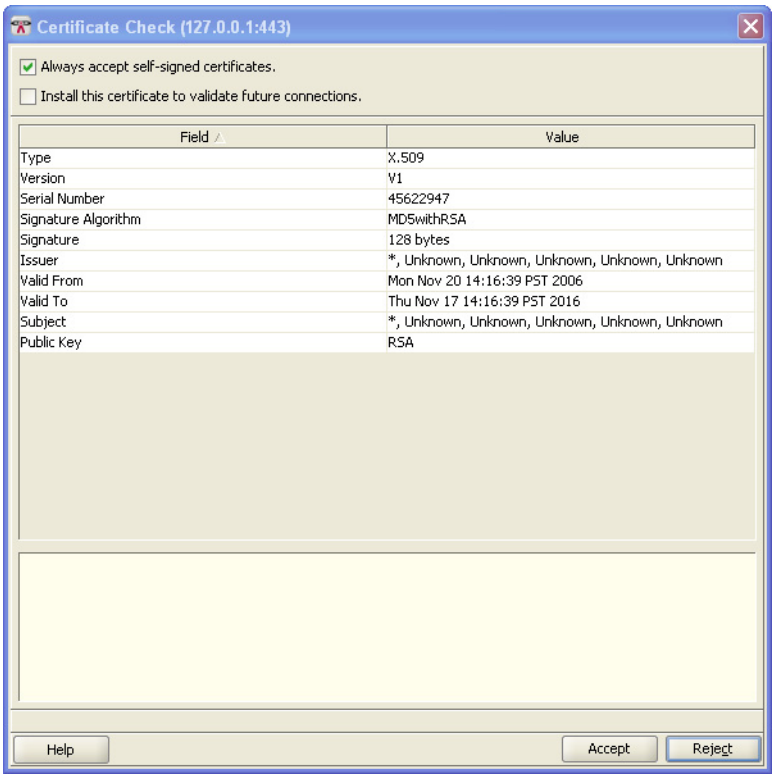
4. Enter a username and password, if required for access to the service. Usernames and passwords for accessing *RingMaster Services* are configured on the Service Settings tab. (See **Setup Tab**.)
5. To configure *RingMaster Client* to remember the username and password for *RingMaster Service* access, select **Remember user name and password.**
6. If the **Certificate Check** dialog is displayed, click **Accept**.



(For more certificate options, see **Certificate Check**.) If the **Finish** button does not become available, read the last message in the **Open Progress** message area of the page to determine why the service could not be reached. Here are common error messages and suggestions for troubleshooting them:

- Unable to connect to address: ip-addr:tcp-port-number— Verify that the service is running on the server.
- Connection error for address: ip-addr:tcp-port-number — Verify that the service has been started. If the service is running, verify that the certificate on the server is still valid (for example, is not out of date).
- HTTP 403: Forbidden — This message can indicate that the username and password are invalid. Ask the administrator for a username and password.

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Certificate Check

If a **License** message appears, go to “Licensing” in the publication *RingMaster Planning Guide*.

When the *RingMaster Client* connects to *RingMaster Services*, it checks the certificate presented by *RingMaster Services* to verify the certificate’s validity. The certificate is in a key store file on the server. The default key store file is **.rmservices_keystore**. This file contains a self-signed certificate for *RingMaster Services*. You can use this certificate or you can configure services to use a different key store file containing a different certificate. (See **Setup Tab**.) By default, the *RingMaster Client* does not accept self-signed certificates, even from *RingMaster Services*. Instead, when *RingMaster Services* or another device presents a self-signed certificate to the *RingMaster Client*, the **Certificate Check** dialog box appears on the client and displays the certificate information.

Options you select in this dialog box apply to all HTTPS connections with a *RingMaster Client*. For example, the *RingMaster Client* also checks the validity of certificates presented by MXs, and the settings you select in this dialog affect those connections too.

To complete the connection:

1. Select one or both of the following options, within 60 seconds after the **Certificate Check** dialog is displayed:
   - **Always accept self-signed certificates —** Use this option to configure the RingMaster Client to always accept a self-signed certificate from the RingMaster monitoring service and from MXs.
   - **Install this certificate to validate future connections —** Use this option to accept the certificate and consider the certificate to be valid for future connections.

When you use this option, the **Certificate Check** dialog box is not shown again for the certificate, even if the certificate becomes out of date.

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2. Click **Accept**. To reject the certificate and refuse the connection, click **Reject**. *RingMaster* ends the connection.

If none of the checkboxes in Step 1 are checked, the **Certificate Check** dialog box is re-displayed each time the *RingMaster Client* attempts to establish a connection with *RingMaster Services*.

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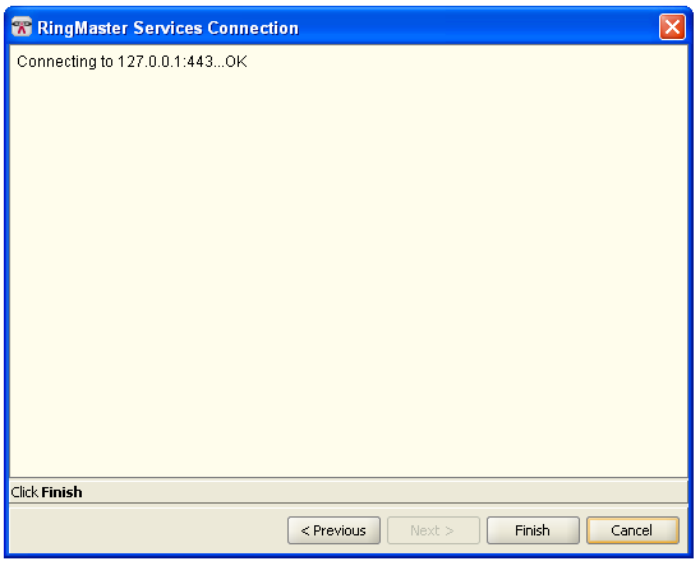
3. A dialog is shown briefly as a *RingMaster Services* connection is established. Click **Finish**.



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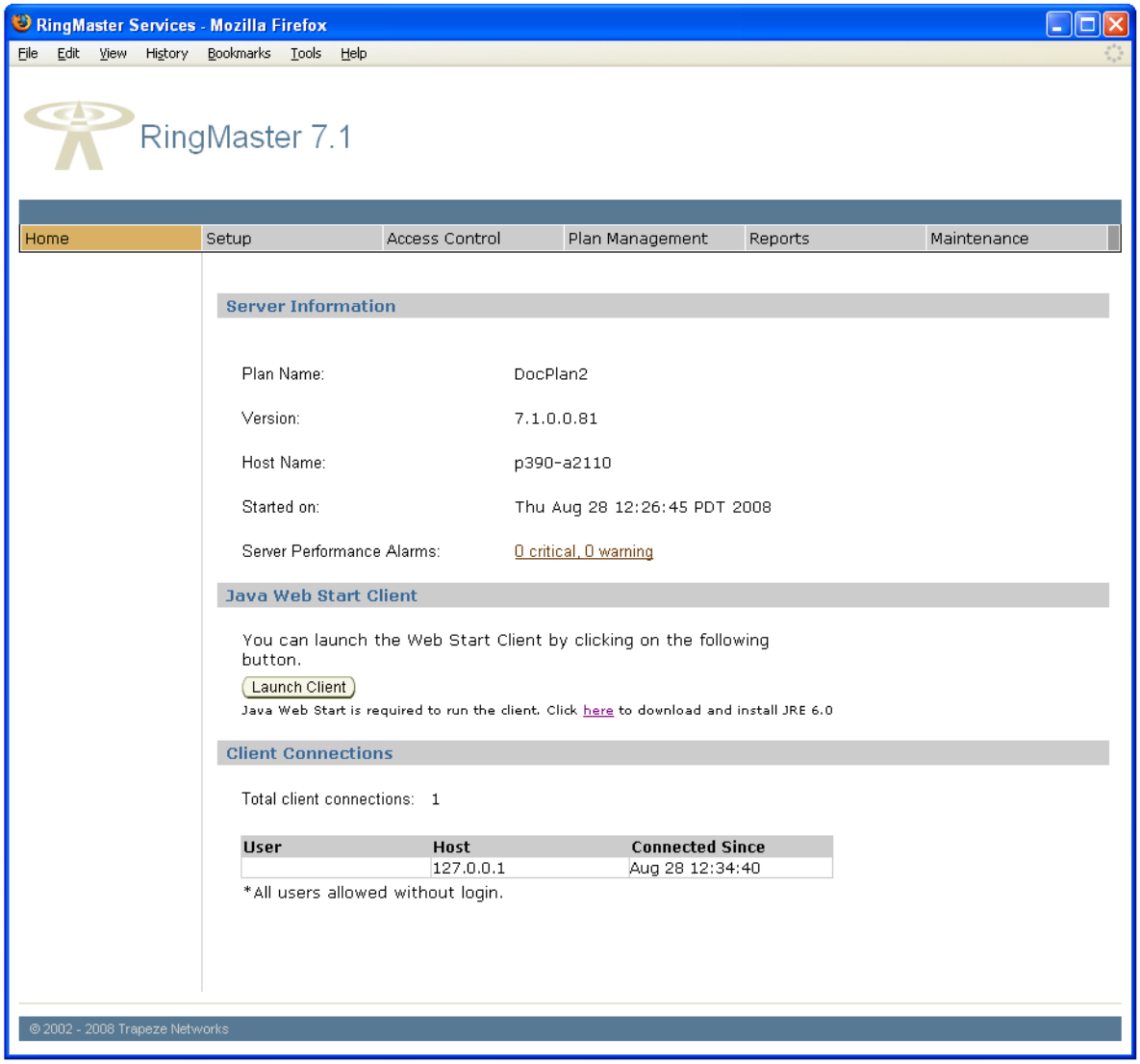
RingMaster Services Home Page

To change server settings:

1. Select **Services > Setup**. A browser window opens, displaying the **RingMaster Services Setup** page displayed. Click on **Home** and you see the following page.



The window above shows you information on the *RingMaster Server* and its performance, allows you to Launch a *Web Start Client*, and provides status regarding **Users** on the server.

You can click on the tabs for **Setup**, **Plan Management**, **Reports** and **Maintenance**. Each of these is described in paragraphs below.

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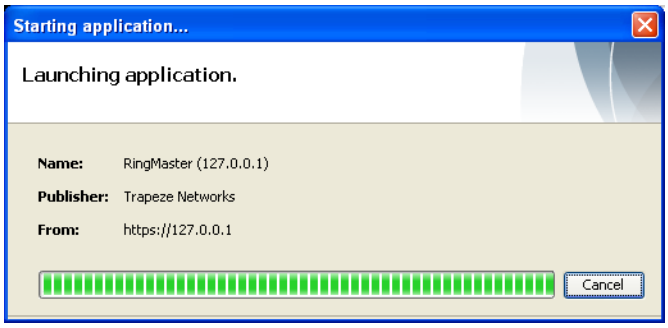
Web Start Client

If you click **Launch Client**, a *RingMaster Web Start Client* will be installed on your workstation. You will see a *Java* startup image, followed by the dialog below:



If this fails, click on the link provided to install *JRE 6.0*.

You then see the *RingMaster Services* connection dialog shown below:

Select or enter the address of the *RingMaster Server* you wish to connect to and continue normally.

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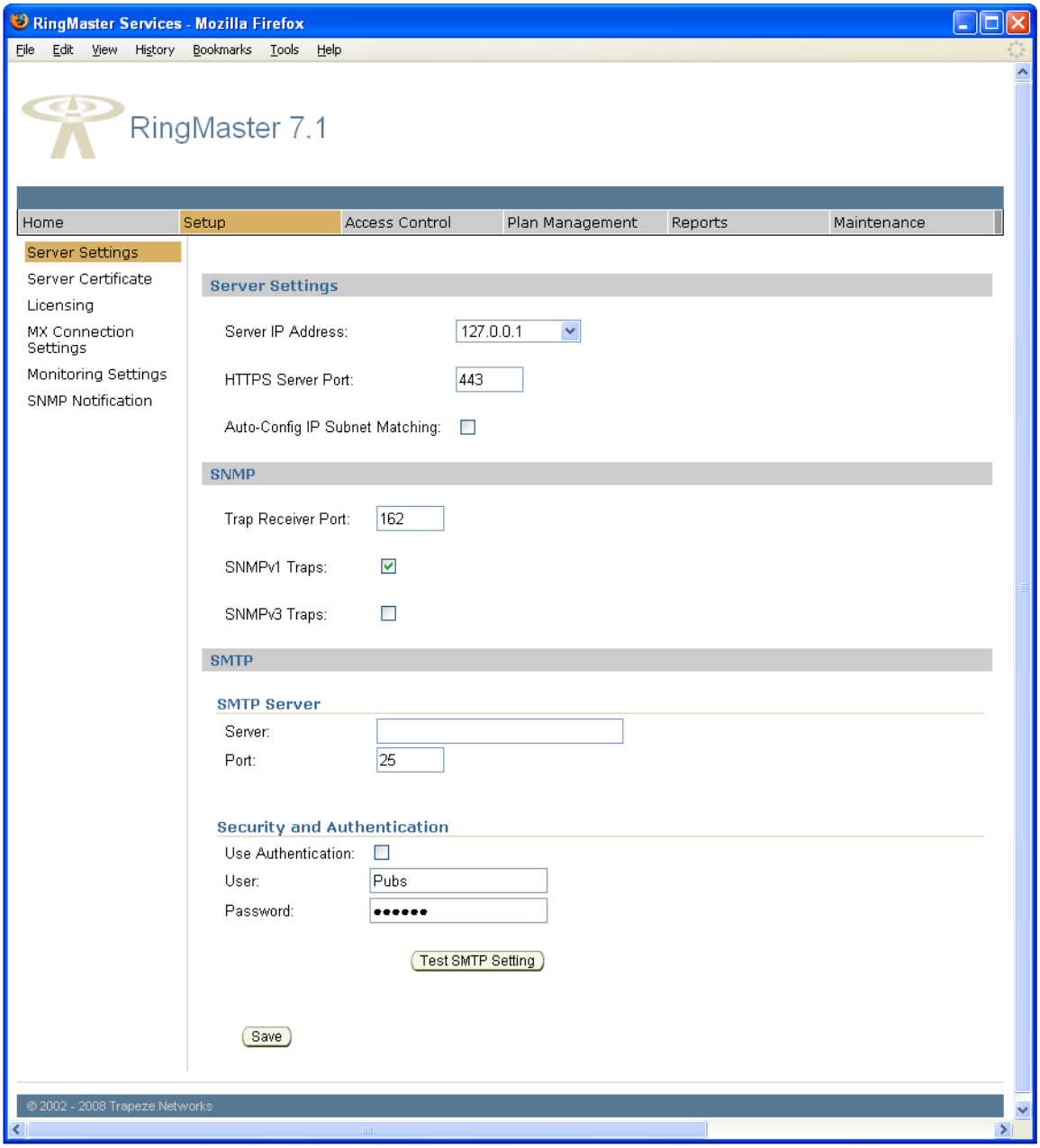
Setup Tab

Server Settings

Service settings control connection parameters, key store information, and access control to *RingMaster Services*.

To change server settings:

1. Select **Services > Setup**. A browser window opens, displaying the **RingMaster Services Setup** page with the **Server Settings** page displayed. You can also click on the **Setup** tab in the **Home** page.



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The port numbers used by *RingMaster Services* must not be used by other applications on the server where *RingMaster Services* is installed. If port 443 or 162 is used by another application, change the port number for *RingMaster Services* or for the other application.
You can only access this page to change *RingMaster* port 443 if it was able to get this port. If another application is running, *RingMaster Services* cannot display this web page. **services-conf.xml** must be edited manually or you must call TAC.

2. To change the TCP port on which *RingMaster Services* listens for requests from *RingMaster*, type or select the port number in the **HTTPS Server Port** field.
The default is 443.

When you click **Save**, all instances of the *RingMaster Client* lose connection with the service and must re-connect on the new port number. The HTTPS port number is automatically updated for the *RingMaster Client* and connection is restored. Other clients must use the **Monitor Service Select** wizard to change the service port and reconnect.

3. To enable *RingMaster* to re-use an MX configuration to replace an old MX with a new one, select **Auto-Config IP Subnet Matching**. (For more information about this option, see "Replacing an MX and Reusing the Configuration" in the publication *RingMaster Configuration Guide*.)
4. The change the UDP port on which *RingMaster Services* listens for SNMP traps, type or select the port number in the **Trap Receiver Port** field. The default is 162.
5. To enable *RingMaster Services* to receive traps, select one or both of the following trap types:
   - **SNMP V1 Traps**
   - **SNMP V3 Traps**

You also must add *RingMaster Services* as a notification target on each MX. *RingMaster Services* does not start listening for SNMP notifications from an MX until you add *RingMaster Services* as an SNMP notification target to the MX. (To configure *RingMaster Services* as a notification target for an MX, see "Configuring *RingMaster Services* as a Notification Target" in the publication *RingMaster Configuration Guide*.)

6. To change the name of the key store file that contains the encryption keys *RingMaster Services* uses for authentication with *RingMaster*, edit the name in the **File** field. The default name is .**rmservices_keystore**.

Caution must be used when editing this. If a change is unsuccessful, you will not be able to start *RingMaster Services*. You will have to call TAC.

7. To change the password that protects access to the key store file, edit the value in the **Password** field.
8. To specify the file type for the key store file, select one of the following:
   - **PKCS12** — Public-Key Cryptography Standard number 12.
   - **JKS** — Java Key Store, a format used by Java platforms and applications.

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Server Certificate

Select **Server Certificate** from the **Setup** browser window and view server certificates.

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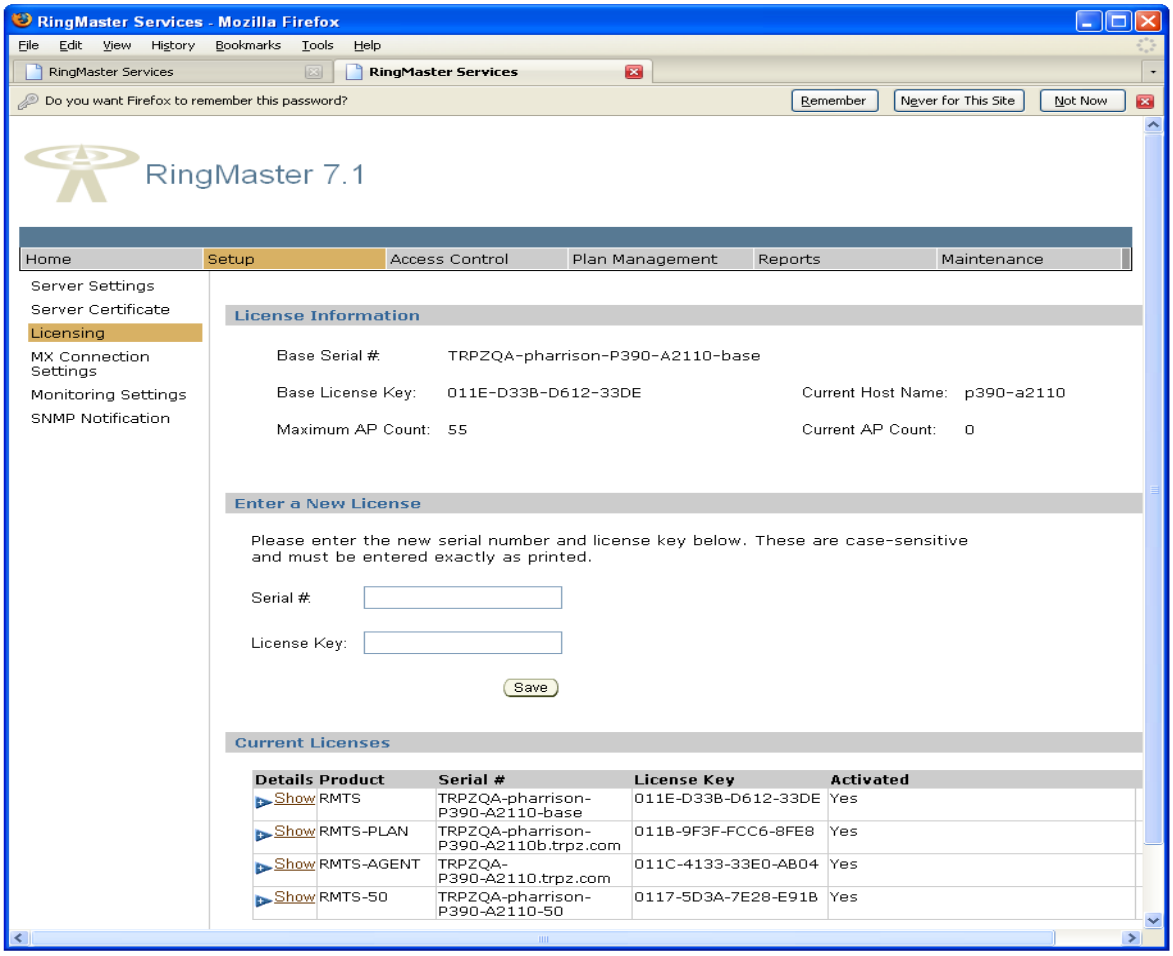
Licensing

Select **Services** > **Licensing** from the *RingMaster* main menu bar to open a browser window and view product licensing information, or to get access to Trapeze Networks product licensing server Web page.



This window shows you existing license status and allows you to enter new serial numbers and license keys as needed.

You need a valid base license before adding additional licenses

---

Ringmaster has several licensing levels (SKU):

- **EVAL** — Evaluation license is valid for 90 days and enables support for up to 50 APs, unlimited switches, and planning.
- **RMTS** — Base license enables support for up to 5 APs and one switch (must be installed first before installing other RMTS licenses like the RMTS-50, RMTS-100, RMTS-500 and RMTS-PLAN).
- **RMTS-10** — Enables support for up to 10 additional APs.
- **RMTS-50** — Enables support for up to 50 additional APs.
- **RMTS-100** — Enables support for up to 100 additional APs.

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- **RMTS-250** — Enables support for up to 100 additional APs.
- **RMTS-500** — Enables support for up to 500 additional APs.
- **RMTS-1000** — Enables support for up to 1000 additional APs.
- **RMTS-PLAN** — Enables planning.
- **RMTS-AGENT** — Enables RM Agent.
- **SP-EVAL** — SmartPass evaluation license is valid for 90 days and enables support for 50 user accounts.
- **SP** — Base license for SmartPass valid for 50 user accounts
- **SP-ENT** — Enterprise license for SmartPass valid for 10050 user accounts.
- **SP-ACC** — Access license for the access control plug-in (with API), needs SP and SP-ENT for activation.

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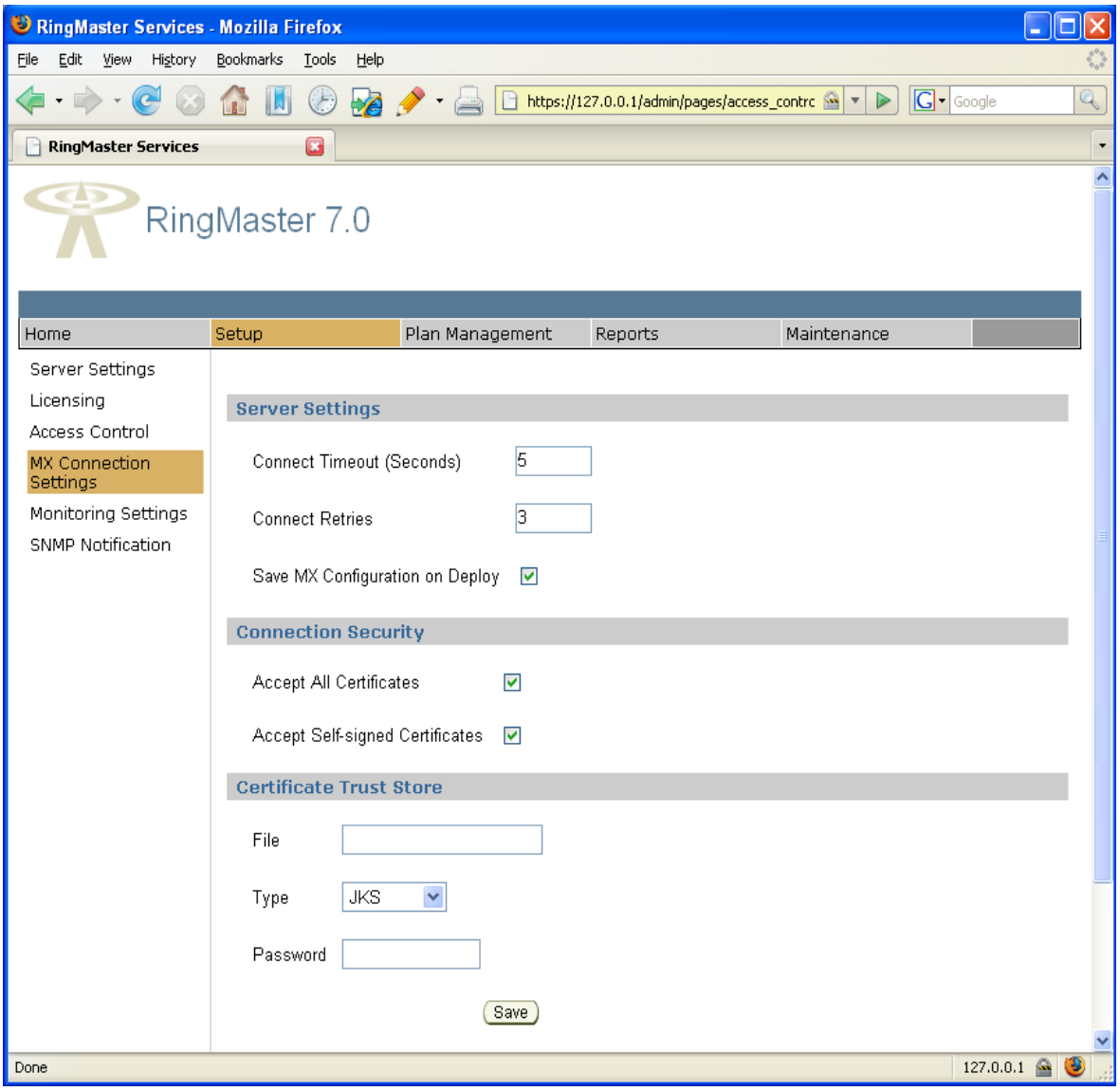
MX Connection Settings

MX connection settings control timeout and retry intervals for connections with monitored MXs, and the types of certificates the service will accept from MXs.

To change MX connection settings:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is open.
2. Select **Setup**, then select **MX Connection Settings**.



3. To change the number of seconds *RingMaster Services* waits for a TCP connection with an MX to reach the Connect stage, type or select the value in the **Connect Timeout** field. You can specify from 1 to 30 seconds. The default is 5 seconds.
4. To change the number of times *RingMaster Services* will reattempt to query an MX, if *RingMaster Services* does not receive a reply to the first query attempt within the connect timeout, type or select the value in the **Connect Retries** field. You can specify from 0 to 5 retries. The default is 3 retries.

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5. To prevent *RingMaster Services* from accepting all types of certificates from the MXs it monitors, click **Accept all certificates** to disable the option. By default, *RingMaster Services* accepts certificates from MXs regardless of whether they are generated by a certificate authority (CA) or they are self-signed certificates. When you disable this option, the **Accept self-signed certificates** option remains enabled.
6. To prevent *RingMaster Services* from accepting self-signed certificates from the MXs it monitors, click **Accept Self-signed certificates** to disable the option. When both the **Accept all certificates** and **Accept Self-signed certificates** options are disabled, *RingMaster Services* accepts only CA generated certificates.
7. To specify a key store filename and a password to protect access to that file:
   a. Enter the filename in the File field.
   b. To change the file type for the key store file, select one of the following in the Type pull-down:
      - **PKCS12** — Public-Key Cryptography Standard number 12, the standard format used by *Linux* machines.
      - **JKS** — Java Key Store, a format used by *Java* platforms and applications.
   c. Enter the password in the Password field. When both the Accept all certificates and Accept self-signed certificates options are disabled, and you specify a key store file, RingMaster Services accepts a certificate from an MX only if the public key information for that certificate is in the key store file.

   Click **Save** to save the changes.

Monitoring Settings

By default, status monitoring and monitoring of MX notifications is enabled. Status monitoring supplies data for the Explore and Status Summary windows of the Monitor tab. SNMP notifications (traps) generated by MXs supply data for the **Client Monitor**, **RF Monitor**, and **RF Trends** windows. **Table 1– 1** lists the source of the data for each window in the Monitor button and for the **Performance Statistics** window.

Table 1– 1. Sources of Monitor Data

RingMaster Client Display	Data Source	Default
Monitor — Status Summary	Status monitoring of MXs by *RingMaster Services*	Enabled
Monitor — Clients	Enable Client Session Collection option	Enabled
Monitor — Traffic	Radio and Port statistics.	Enabled
Monitor — High Utilization, RF Interference, and Coverage Hole	Enable Traffic & RF Trending option and configure RF Threshold Settings	Enabled
Alarms	Input from all polls	Enabled

The monitoring options require SNMP traps to be enabled on the monitored MXs and also require *RingMaster Services* to be configured as a notification target (trap receiver) for each of the MXs.

The data for some reports also requires monitoring options to be enabled. For information, see descriptions for each report in **Chapter 7 "RingMaster Reports"**.

To change monitoring settings:

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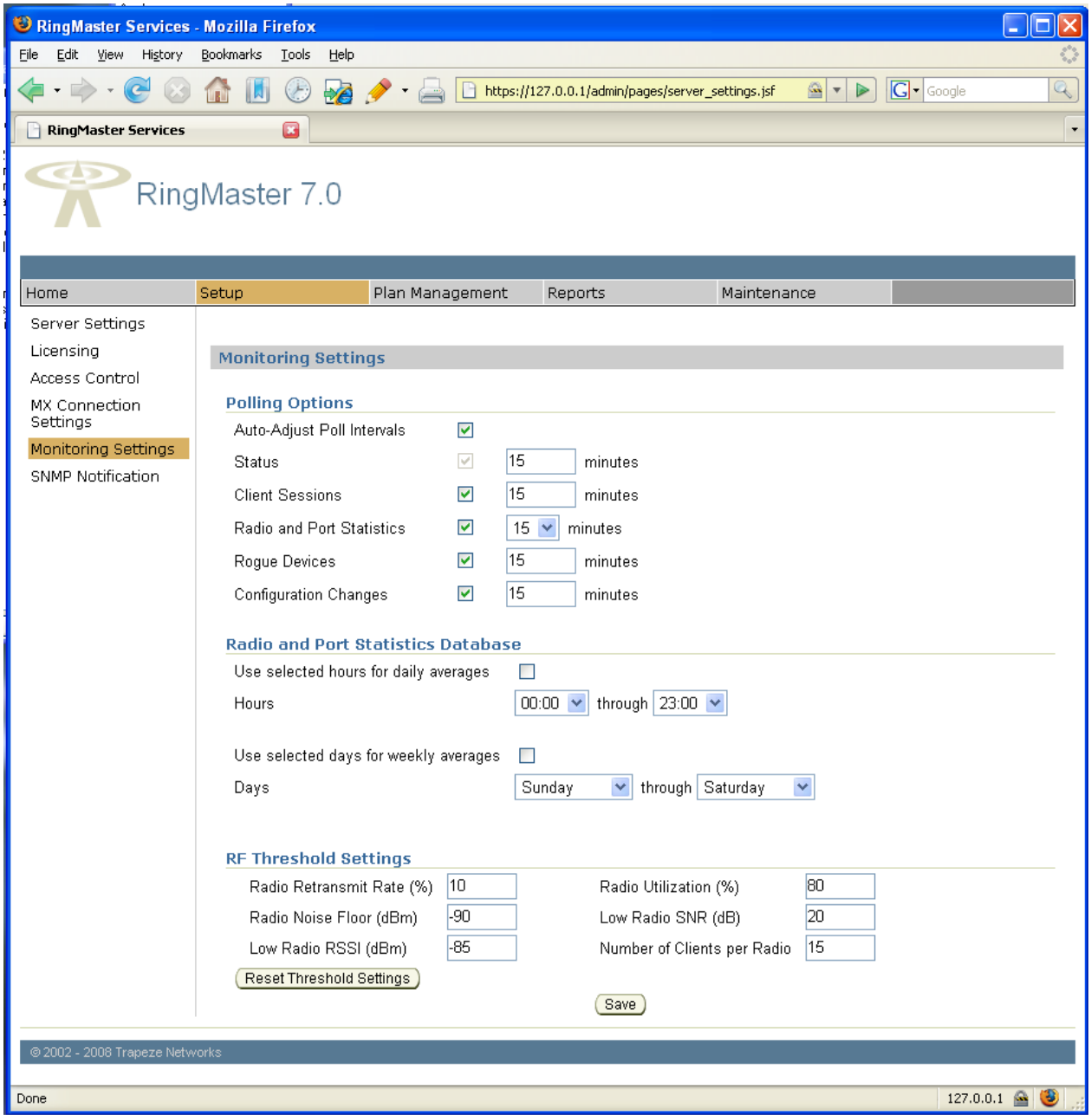
1. Select **Services > Setup** or select the browser window if *RingMaster Services* is already open.
2. Select **Setup**, then select **Monitoring Settings**.



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3. To change **Polling Options**, use click boxes to enable features and enter values you want for enabled items, including:
   - **Auto-Adjust Poll Intervals —** By default, **Auto-Adjust Poll Interval** is selected. If the server detects the number of devices exceeding a certain limit, it will automatically adjust the poll interval for all to a higher value. You will not be able to set a poll interval lower than the recommended setting. If Auto-Adjust Poll Interval is not selected, you can change the poll interval to any value between 5 and 60 minutes.
   - **Status**
   - **Client Sessions**
   - **Radio and Port Statistics**
   - **Rogue Devices**
   - **Configuration Changes**
4. To make choices regarding the **Radio and Port Statistics Database**, make the following selections:
   - **Average Specific Times in Rollup — C**heckbox
   - **Include Days of week and Hours —** This restricts data averaging for reports for higher accuracy within specified hours/days.
5. To change the **RF Threshold Settings**, enter new settings for the following statistics [default settings are indicated in brackets]:
   - **Radio Retransmit Threshold (%) [10]**
   - **Radio Noise Floor Threshold (dBm) [-85]**
   - **Radio Signal Level Threshold (dBm) [-75]**
   - **Utilization Threshold (%) [80]**
   - **SNR Threshold (dBm) [15]**
   - **Number of Clients per Radio [15]**

   You can click **Reset Threshold Settings** to revert to default values.

   Click **Save** to save changes.

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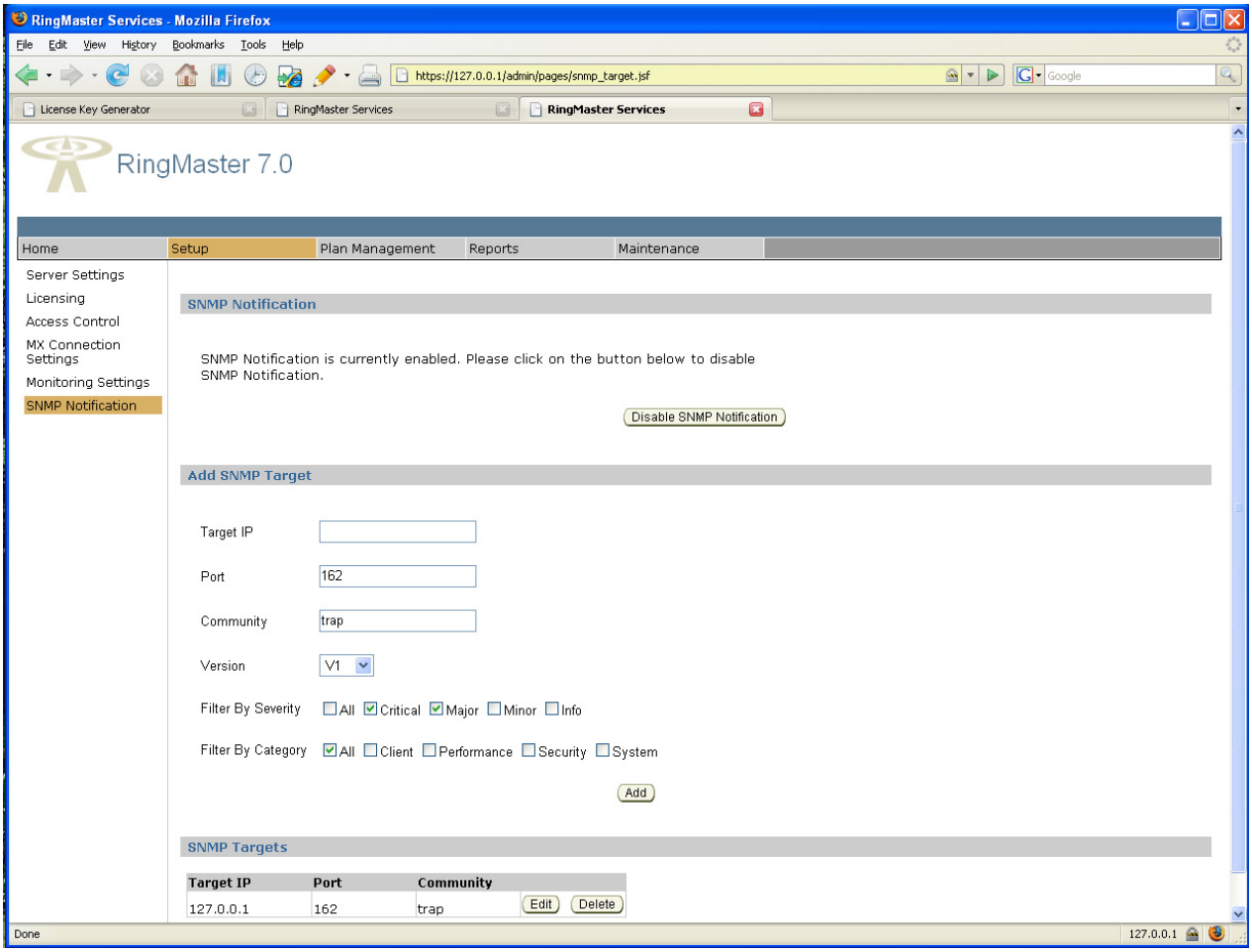
SNMP Notification

SNMP traps that the *RingMaster Server* will be able to generate will be sent to receivers configured in the RM Web page.

To set up SNMP notifications:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is already open.
2. Select **Setup**, then select **SNMP Notification**.



3. Enter a **Target IP**, accept or change the **Port** aned **Community** entries and select a versio of SNMP from the **Version** pull-down. Use check boxes to determine **Category** and **Severity** filter settings and then click **Add**.

   SNMP Targets will be displayed.

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Access Control Tab

RingMaster Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
RingMaster Services
RingMaster Services
RingMaster 7.1
Home
Setup
Access Control
Plan Management
Reports
Maintenance
Settings
User Groups
RADIUS Servers
Access Control
Currently RingMaster services allows all users to access RingMaster without a user name and password being required. To enforce user login control for RingMaster services, select the login-required option below. (To enforce logins with a user name and password at least one user with the Service Administrator privilege needs to be created).
Enable login-required
Local Users
Select
Name
User Group
Add User

You can create a user account with privileges either as a full **Administrator**, allow users to have **Provision** capabilities, or allow them only **Monitor** privileges. See **Table 1– 2** for privilege definitions. For details, refer to “Restricting Access to *RingMaster*” in the “Getting Started” chapter of the *Trapeze RingMaster Reference Manual*.

You must add a user first if none are defined before enabling access control.

Table 1– 2. User Privilege Levels

Privilege Level	Access Control	Configuration	Monitoring
Administrator	yes	yes	yes
Provision	no	yes	yes
Monitor	no	no	yes

To change **Access Control** settings:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is open.
2. Select **Setup**, then select **Access Control**.

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To configure access control:

1. Select **Services > Setup** from the *RingMaster* menu bar. *RingMaster Services* is displayed in your default Web browser**.**
2. Select **Access Control**.
3. Click **Enable login-required**. Enter a username and password for administrative access. Click **OK**. (You must configure an admin account before you can configure provisioning or monitoring users.)
4. Enter the name under the **Add User** section.
5. Select **Administrator**, **Provisioning User**, or **Monitoring User** form the **Role** list.
6. Enter the password. Re-enter the password.
7. Click **Save**. The new account appears in the Authorized Users section.

The **RingMaster Services Home Page** lists authorized users, their roles and connection status/times

8. To remove an account, click **Delete** next to the desired account.
9. To reset a password, click **Edit**.

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User Groups

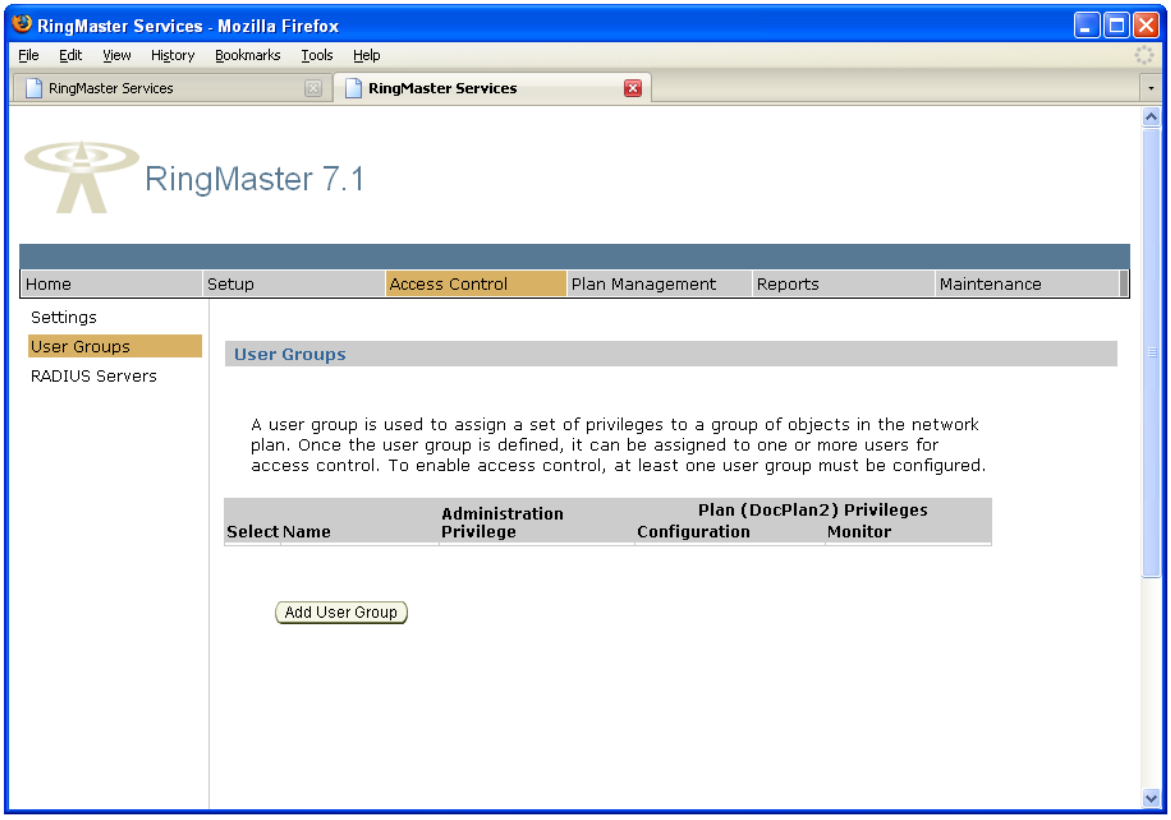
User Groups are created in the **Add User Group** section of the **Setup > Access Control** page for configuring view restriction rules for Monitoring Users. View restriction rules are configured only for the current plan. These rules are not applied when switching to a different plan.

The following new fields are added to the **Add User** section of the **Setup Access Control** page as well as the **Edit User Info** popup window.

These fields are enabled when **Monitoring Users** are specified:

- A check box for view restriction.
- Scope Type Combo box that allows a user to select a restriction scope type. Site and Building are the only two supported scope types in the 7.0 release.
- Scope Instance Combo box that shows all the related instances of the selected scope type.

The following is a screen shot showing the **Access Control > User Groups** window containing these new fields:


RingMaster Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
RingMaster Services
RingMaster Services
RingMaster 7.1
Home
Setup
Access Control
Plan Management
Reports
Maintenance
Settings
User Groups
RADIUS Servers
User Groups
A user group is used to assign a set of privileges to a group of objects in the network plan. Once the user group is defined, it can be assigned to one or more users for access control. To enable access control, at least one user group must be configured.
Select
Name
Administration Privilege
Plan (DocPlan2) Privileges
Configuration
Monitor
Add User Group

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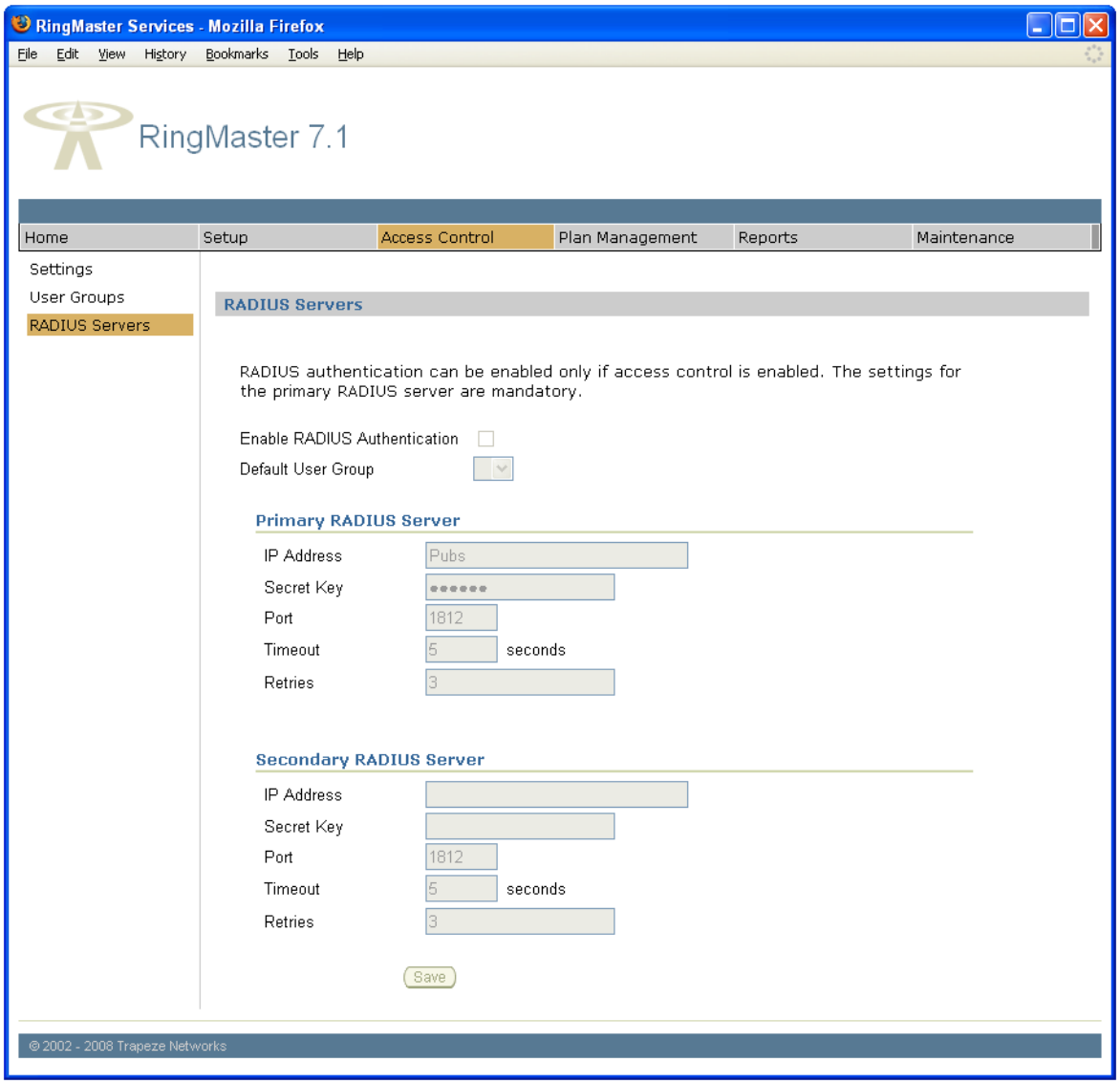
RADIUS Servers

RADIUS authentications is enabled from the Access Conytrol > RADIUS Servers window.



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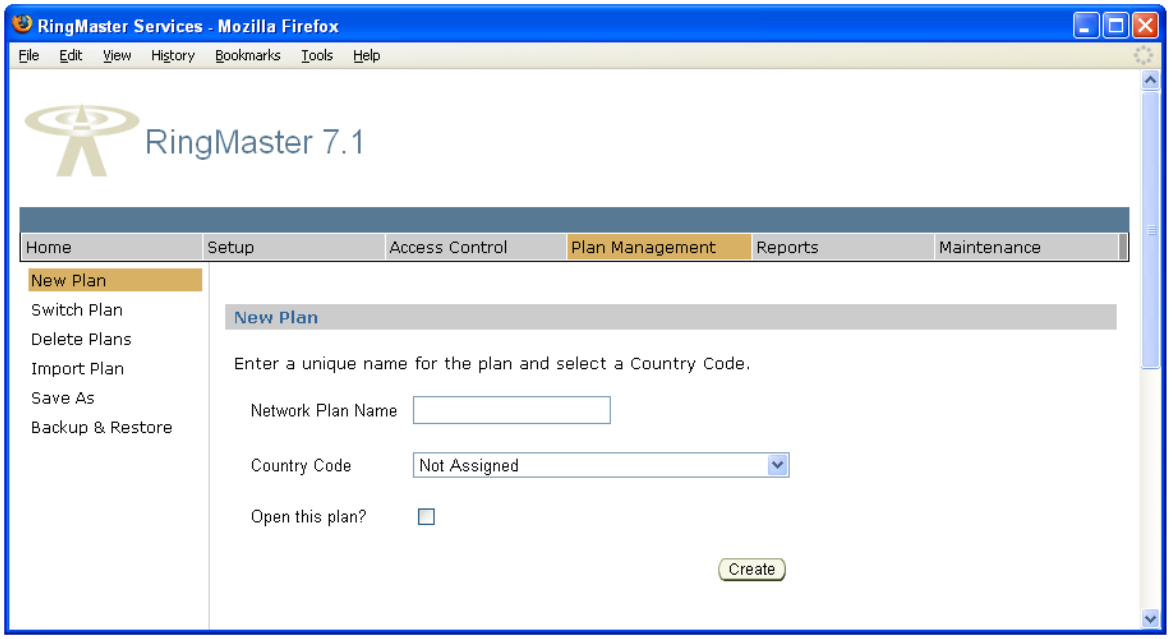
Plan Management Tab

New Plan

To set up a new network plan:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is already open.
2. Select **Plan Management**, then select **New Plan**.



Enter a new **Network Plan Name**, select a **Country Code**, select **Open This Plan?** and click **Create.**

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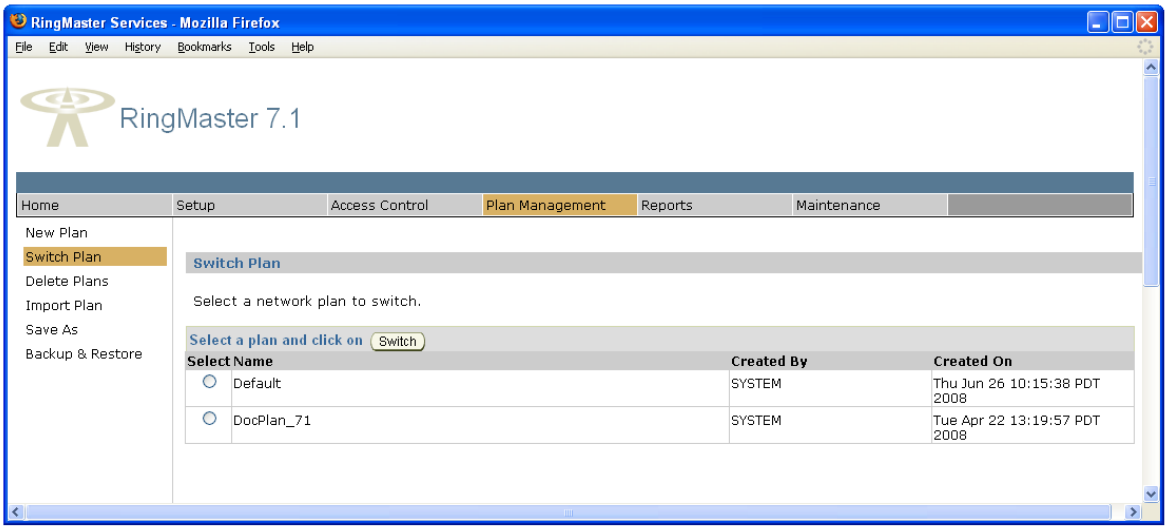
Switch Plan

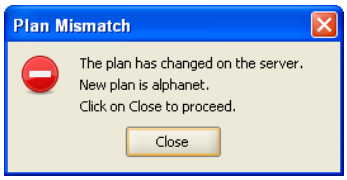
To switch network plans:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is already open.
2. Select **Plan Management**, then select **Switch Plan**.



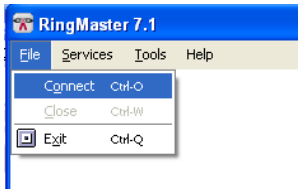
Click the radio button beside the plan you wish to open and select **Switch**.

3. The current main window will tell you the plan has changed:



Click **Close**.

4. You must re-connect to continue.



The new plan is now open.

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Delete Plans

To delete network plans:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is already open.
2. Select **Plan Management**, then select **Delete Plans**.

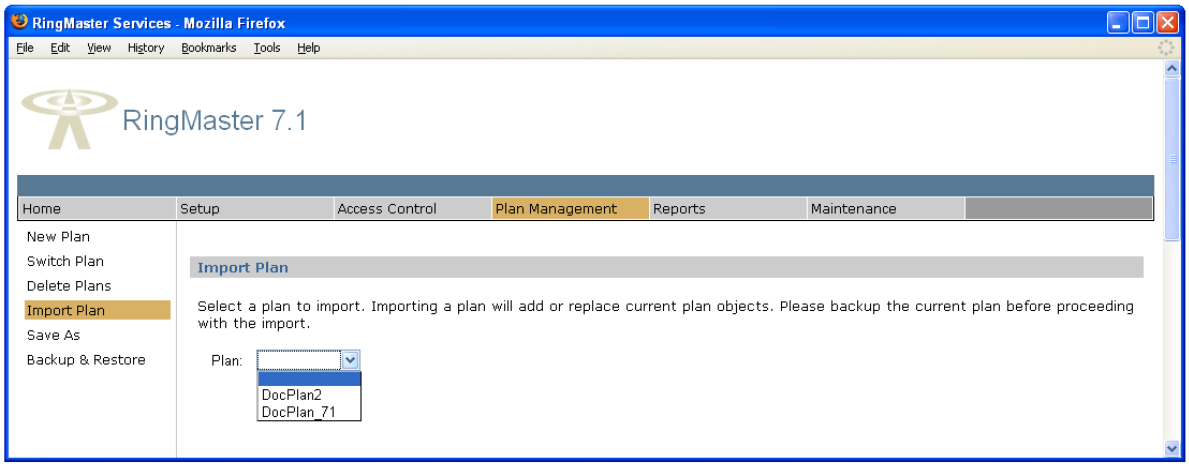
RingMaster Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
RingMaster 7.1
Home Setup Access Control Plan Management Reports Maintenance
New Plan
Switch Plan
Delete Plans
Import Plan
Save As
Backup & Restore
Delete Plans
Select one or more network plans to delete. To delete the plan currently being used by the server, you must first switch the server to a different plan.
Select plans and click on Delete
Select All | Select None
Select Name
Created By
Created On
DocPlan2
SYSTEM
Tue Apr 22 13:19:57 PDT 2008
DocPlan_71
SYSTEM
Tue Apr 22 13:19:57 PDT 2008

Click the check boxes beside plans you wish to delete and select **Delete**.

Import Plan

To import network plans:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is already open.
2. Select **Plan Management**, then select **Import Plan**.


RingMaster Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
RingMaster 7.1
Home Setup Access Control Plan Management Reports Maintenance
New Plan
Switch Plan
Delete Plans
Import Plan
Save As
Backup & Restore
Import Plan
Select a plan to import. Importing a plan will add or replace current plan objects. Please backup the current plan before proceeding with the import.
Plan:
DocPlan2
DocPlan_71

Select the plan you wish to import from the pull-down menu.

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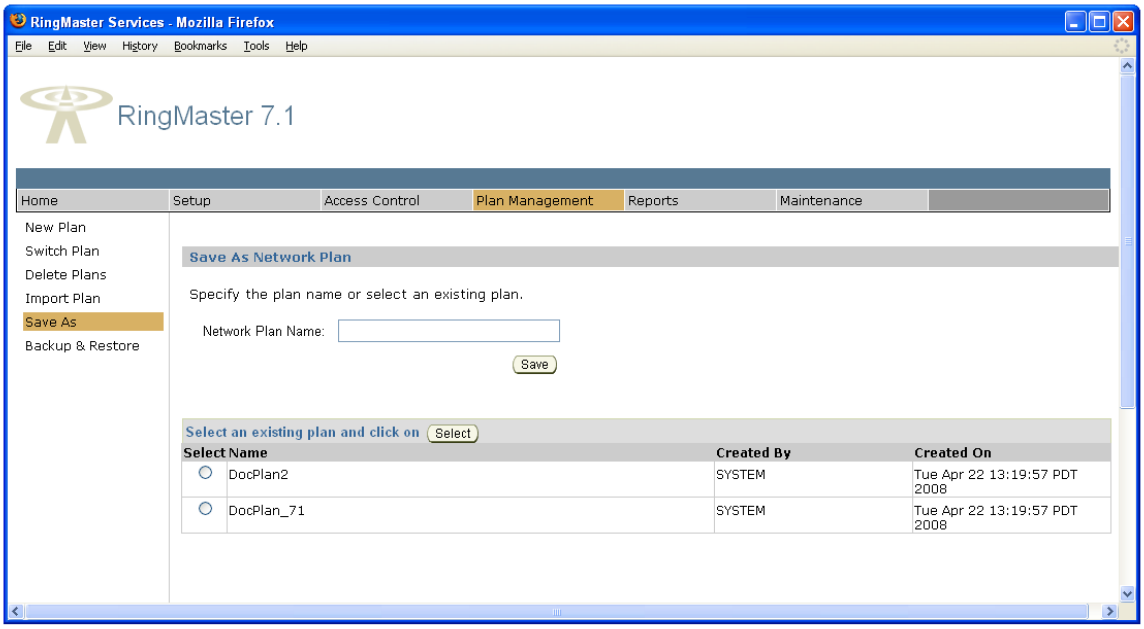
Save As

To import network plans:

1. Select **Services > Setup** or select the browser window if *RingMaster Services* is already open.
2. Select **Plan Management**, then select **Save As**.



Enter a new plan name and click **Save**.

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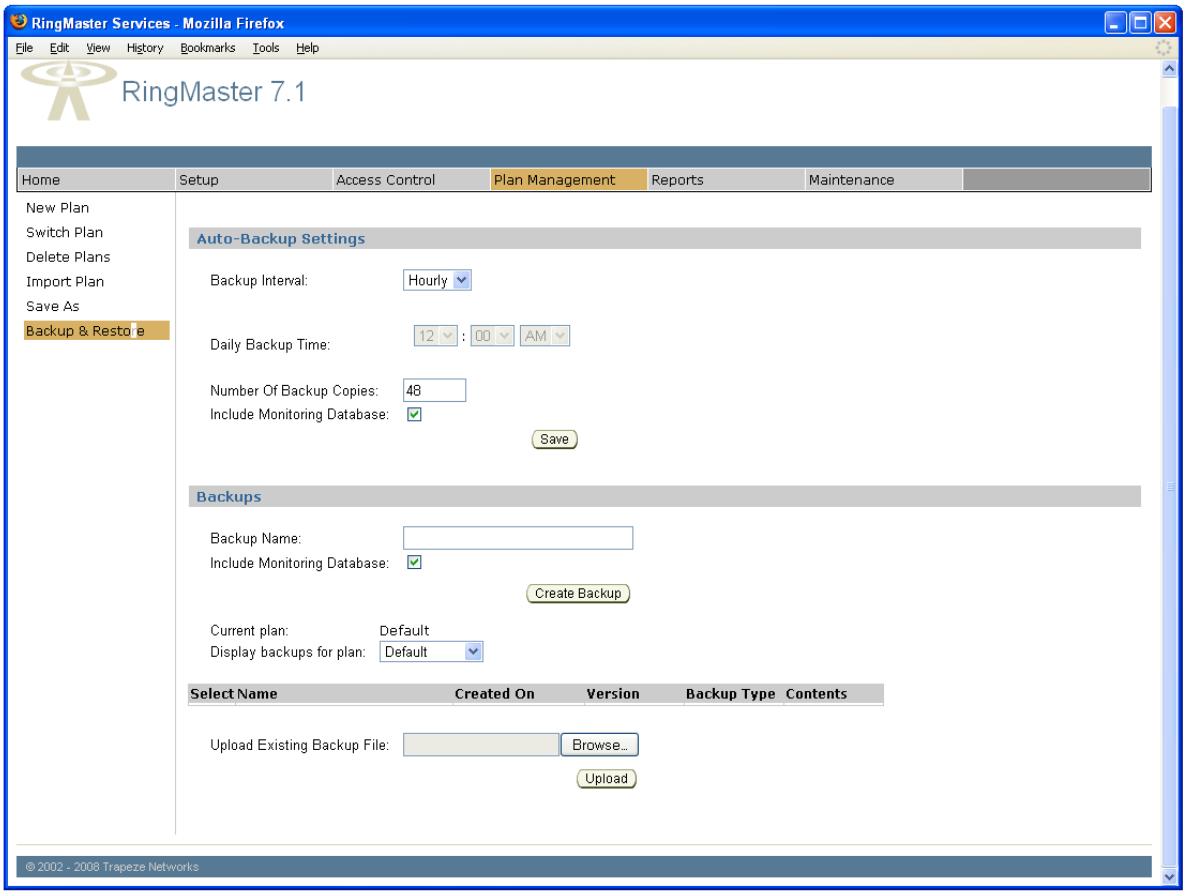
Backup and Restore

RingMaster Services regularly back up network plans at configurable intervals. In addition to regular backups, you can create a backup at any time. You can create a backup from within *RingMaster* or at a command line. From within *RingMaster*, you change settings for automatic backups. To manage backups, select **Services > Backup & Restore**. If *RingMaster Services* is already open in the browser window, select **Plan Management**, then select **Backup & Restore**.



Existing backups for network plans are listed. Backups automatically created by *RingMaster* do not have names, and their type is **Automatic**. Backups you create have names, and their type is **Manual**. Only backups for the currently open plan are listed. By default, backups created automatically by *RingMaster* are stored in the following location:

`RingMaster\backup\auto\`***`plan_name`***

Backups created by you are stored in the following location by default:

`RingMaster\backup\manual\`***`plan_name`***

RingMaster zips backup files and assigns them unique names. You can assign a name to a backup that you create. However, this name does not appear in the backup directory. To select a plan based on a name you assign, use the **Backup/Restore** dialog.

Backing Up a Plan

To immediately create a backup:

1. Select **Services > Backup & Restore**. If *RingMaster Services* is already open in the browser window, select **Plan Management**, then select **Backup & Restore**.
2. Type a name for the backup in the **Backup Name** field.
3. Click **Create Backup**. When the backup is complete, it appears in the list of backups. (If you do not see the backup, scroll to the bottom of the list.)

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Changing Backup Settings

To change settings for automatic backups:

1. Select **Services > Backup & Restore**. If *RingMaster Services* is already open in the browser window, select **Plan Management**, then select **Backup & Restore**.
2. To change how often *RingMaster* automatically backs up network plans, select **Hourly** or **Daily** from the **Backup Interval** pull-down list.
3. If you select **Daily**, specify the time to create the backup.
4. To change the maximum number of backup copies RingMaster will keep for a plan, change the number in the **Number of backup copies** field. Click **Save**.

Restoring a Plan from a Backup

To restore a plan from a backup:

1. Select **Services > Backup & Restore**. If *RingMaster Services* is already open in the browser window, select **Plan Management**, then select **Backup & Restore**.
2. Select the backup you want to restore. Click **Restore**.

Copying a Plan Backup from One Server to Another

Copy a plan to another server by copying the backup file for that plan to the other server, and then restoring the plan on the other server from the backup.

To copy a network plan backup from one server to another:

1. Select **Services > Backup & Restore**. If *RingMaster Services* is already open in the browser window, select **Plan Management**, then select **Backup & Restore**.
2. Select the backup you want to restore. Click **Transfer**. The **Transfer Backup** dialog appears.
3. Type the IP address of the host where another instance of **RingMaster Services** is installed.

4. If the port on which the other instance of *RingMaster Services* listens for traffic from RingMaster is different from the default, edit the number in the **Service Port** field to match.
5. Type the username and password required by the other instance of *RingMaster Services*. Click **Transfer**.
6. On the server to which you copied the backup, access the **Backup/Restore** page.
7. Select the backup and click **Restore**.

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Deleting a Plan Backup

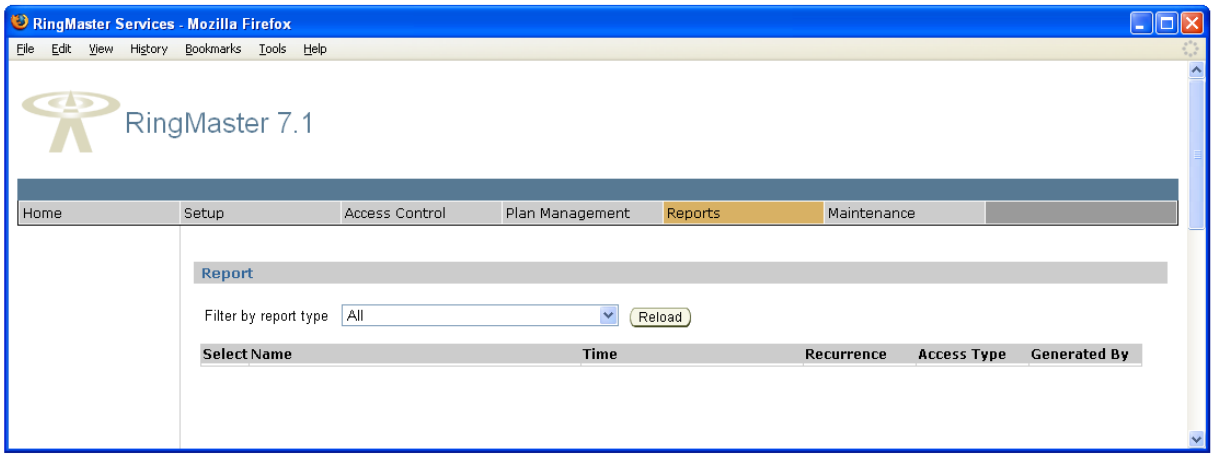
To delete a plan backup:

1. Select **Services > Backup & Restore**. If *RingMaster Services* is already open in the browser window, select **Plan Management**, then select **Backup & Restore**.
2. Select the backup and click **Delete**.

For more information on network plans, refer to the publication *RingMaster Planning Guide*.

Reports Tab

This tab allows you to view, with and without filtering, and to delete reports.



The **Filter by report type** pull-down provides items by which reports can be filtered:

- **All**
- **Inventory**
- **Mobile Domain Configuration**
- **Client Summary**
- **Client Details**
- **Client Errors**
- **Wireless Network Usage (Radio Traffic)**
- **Wireless Network Usage (Port Traffic)**
- **RF Summary**
- **Radio Details**
- **Rogue Details**
- **Rogue Summary**
- **Alarm Summary**
- **Alarm History**
- **Security**
- **Client OUI**

Select reports using radio buttons adjacent report entries. There is a **Reload** button provided.

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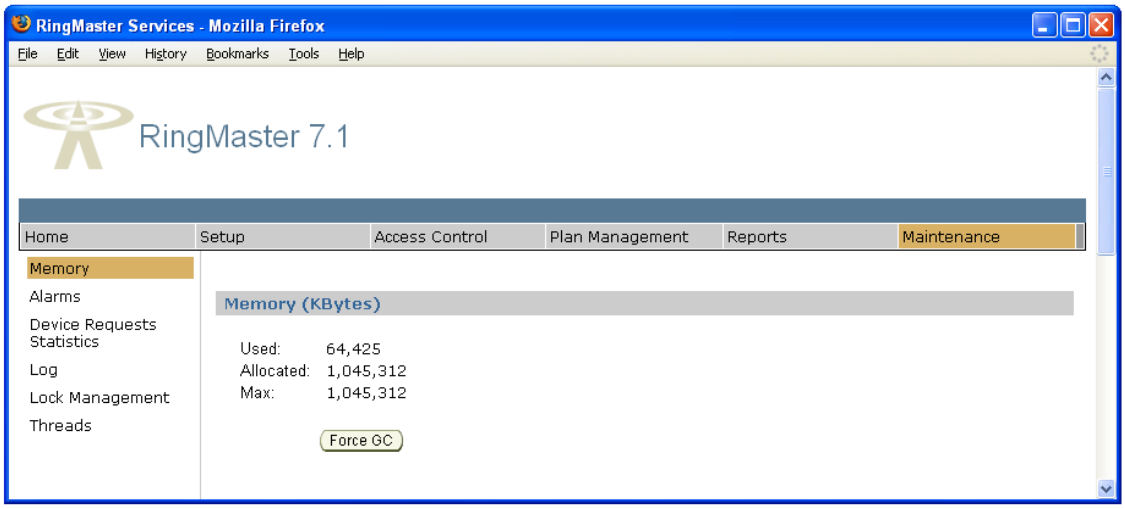
Maintenance Tab

Maintenance pages let you make a of settings, described in the following paragraphs.

Memory

To access memory settings:

1. Select **Services > Setup**, if *RingMaster Services* is not displayed in a browser window.
2. Select **Maintenance**, then select **Memory**.



This screen shows Server Memory **Used**, **Allocated**, and **Maximum**, and provides a button to force Java memory recovery.

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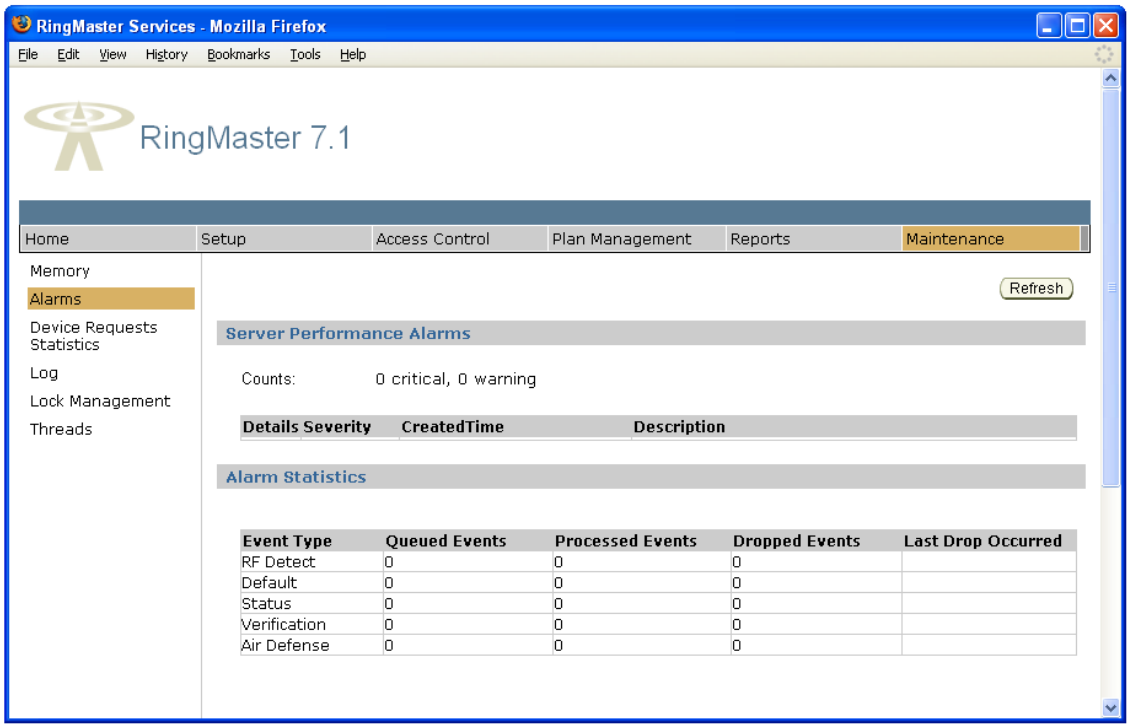
Alarms

Select **Maintenance**, then select **Alarms**.



This window shows **Server Performance Alarms** and **Alarm Statistics** for the server.

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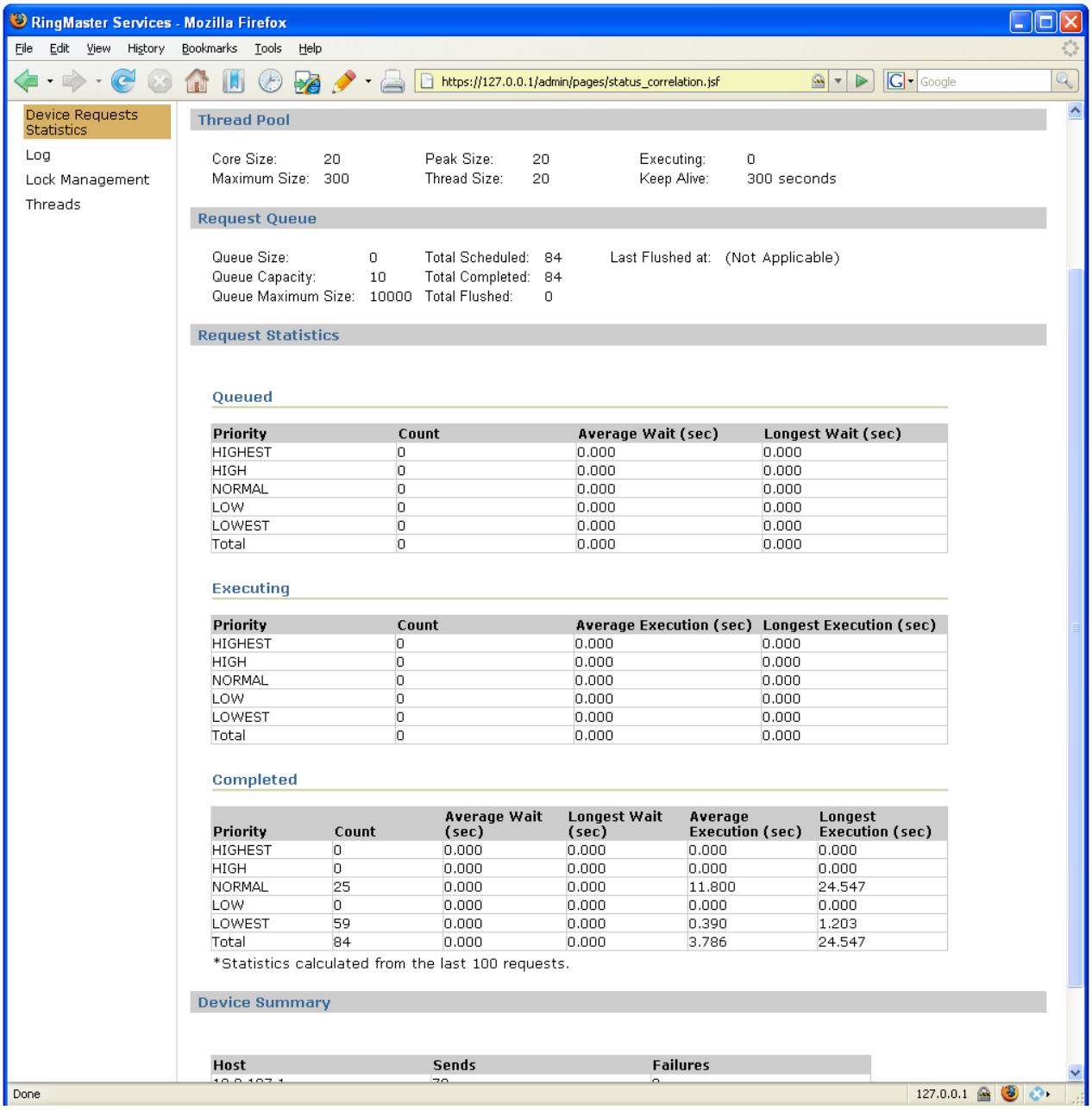
Device Requests Statistics

Select **Maintenance**, then select **Device Requests Statistics**. This is used to assist TAC in troubleshooting *RingMaster* server performance problems


RingMaster Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://127.0.0.1/admin/pages/status_correlation.jsf
Google
Device Requests Statistics
Log
Lock Management
Threads
Thread Pool
Core Size: 20
Maximum Size: 300
Peak Size: 20
Thread Size: 20
Executing: 0
Keep Alive: 300 seconds
Request Queue
Queue Size: 0
Queue Capacity: 10
Queue Maximum Size: 10000
Total Scheduled: 84
Total Completed: 84
Total Flushed: 0
Last Flushed at: (Not Applicable)
Request Statistics
Queued
Priority | Count | Average Wait (sec) | Longest Wait (sec)
HIGHEST | 0 | 0.000 | 0.000
HIGH | 0 | 0.000 | 0.000
NORMAL | 0 | 0.000 | 0.000
LOW | 0 | 0.000 | 0.000
LOWEST | 0 | 0.000 | 0.000
Total | 0 | 0.000 | 0.000
Executing
Priority | Count | Average Execution (sec) | Longest Execution (sec)
HIGHEST | 0 | 0.000 | 0.000
HIGH | 0 | 0.000 | 0.000
NORMAL | 0 | 0.000 | 0.000
LOW | 0 | 0.000 | 0.000
LOWEST | 0 | 0.000 | 0.000
Total | 0 | 0.000 | 0.000
Completed
Priority | Count | Average Wait (sec) | Longest Wait (sec) | Average Execution (sec) | Longest Execution (sec)
HIGHEST | 0 | 0.000 | 0.000 | 0.000 | 0.000
HIGH | 0 | 0.000 | 0.000 | 0.000 | 0.000
NORMAL | 25 | 0.000 | 0.000 | 11.800 | 24.547
LOW | 0 | 0.000 | 0.000 | 0.000 | 0.000
LOWEST | 59 | 0.000 | 0.000 | 0.390 | 1.203
Total | 84 | 0.000 | 0.000 | 3.786 | 24.547
*Statistics calculated from the last 100 requests.
Device Summary
Host | Sends | Failures
Done
127.0.0.1

This window provides information on server threads, queues, executing and completed items, etc.

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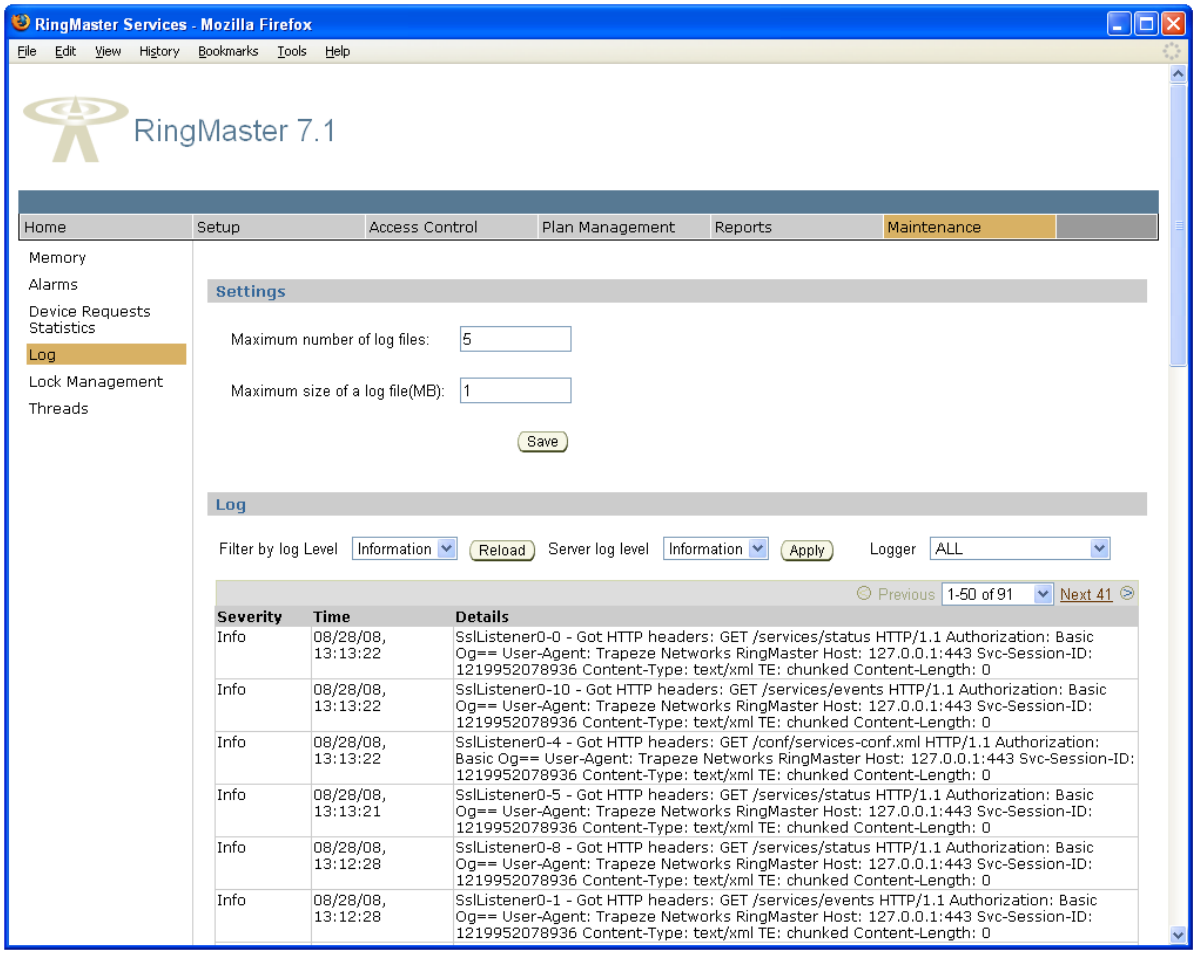
Log

Select **Maintenance**, then select **Log**. TAC may ask you to set a log level for debugging, and then run a report or send the log folder to troubleshoot problems.


RingMaster Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
RingMaster 7.1
Home
Setup
Access Control
Plan Management
Reports
Maintenance
Memory
Alarms
Device Requests Statistics
Log
Lock Management
Threads
Settings
Maximum number of log files: 5
Maximum size of a log file(MB): 1
Save
Log
Filter by log Level Information Reload Server log level Information Apply Logger ALL
Previous 1-50 of 91 Next 41
Severity Time Details
Info 08/28/08, 13:13:22 SslListener0-0 - Got HTTP headers: GET /services/status HTTP/1.1 Authorization: Basic Og== User-Agent: Trapeze Networks RingMaster Host: 127.0.0.1:443 Svc-Session-ID: 1219952078936 Content-Type: text/xml TE: chunked Content-Length: 0
Info 08/28/08, 13:13:22 SslListener0-10 - Got HTTP headers: GET /services/events HTTP/1.1 Authorization: Basic Og== User-Agent: Trapeze Networks RingMaster Host: 127.0.0.1:443 Svc-Session-ID: 1219952078936 Content-Type: text/xml TE: chunked Content-Length: 0
Info 08/28/08, 13:13:22 SslListener0-4 - Got HTTP headers: GET /conf/services-conf.xml HTTP/1.1 Authorization: Basic Og== User-Agent: Trapeze Networks RingMaster Host: 127.0.0.1:443 Svc-Session-ID: 1219952078936 Content-Type: text/xml TE: chunked Content-Length: 0
Info 08/28/08, 13:13:21 SslListener0-5 - Got HTTP headers: GET /services/status HTTP/1.1 Authorization: Basic Og== User-Agent: Trapeze Networks RingMaster Host: 127.0.0.1:443 Svc-Session-ID: 1219952078936 Content-Type: text/xml TE: chunked Content-Length: 0
Info 08/28/08, 13:12:28 SslListener0-8 - Got HTTP headers: GET /services/status HTTP/1.1 Authorization: Basic Og== User-Agent: Trapeze Networks RingMaster Host: 127.0.0.1:443 Svc-Session-ID: 1219952078936 Content-Type: text/xml TE: chunked Content-Length: 0
Info 08/28/08, 13:12:28 SslListener0-1 - Got HTTP headers: GET /services/events HTTP/1.1 Authorization: Basic Og== User-Agent: Trapeze Networks RingMaster Host: 127.0.0.1:443 Svc-Session-ID: 1219952078936 Content-Type: text/xml TE: chunked Content-Length: 0

This window allows you to review the log, and to set filtering and logging values. You can view specific error types by using the pull-down menu shown in the example window above.

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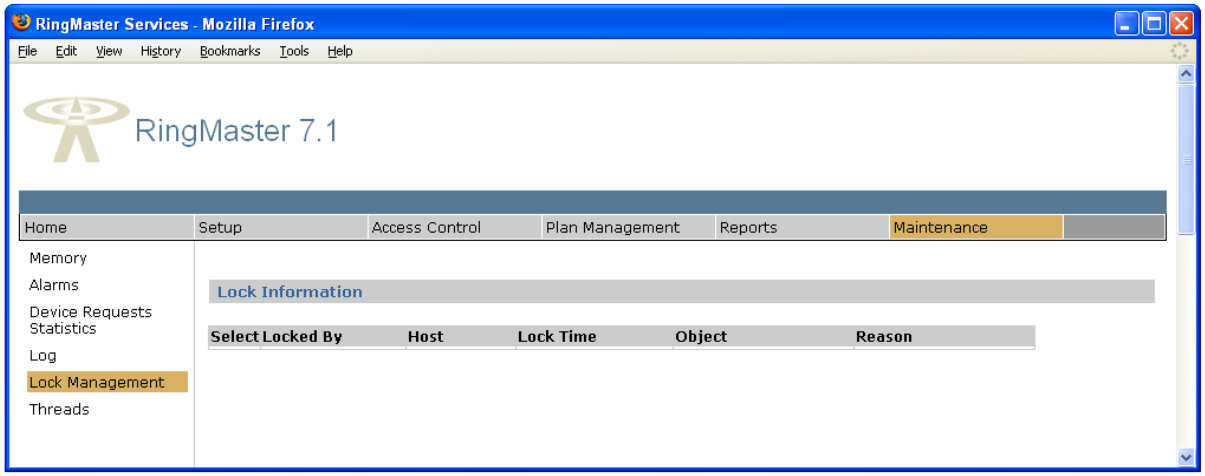
Lock Management

Select **Maintenance**, then select **Lock Management**.



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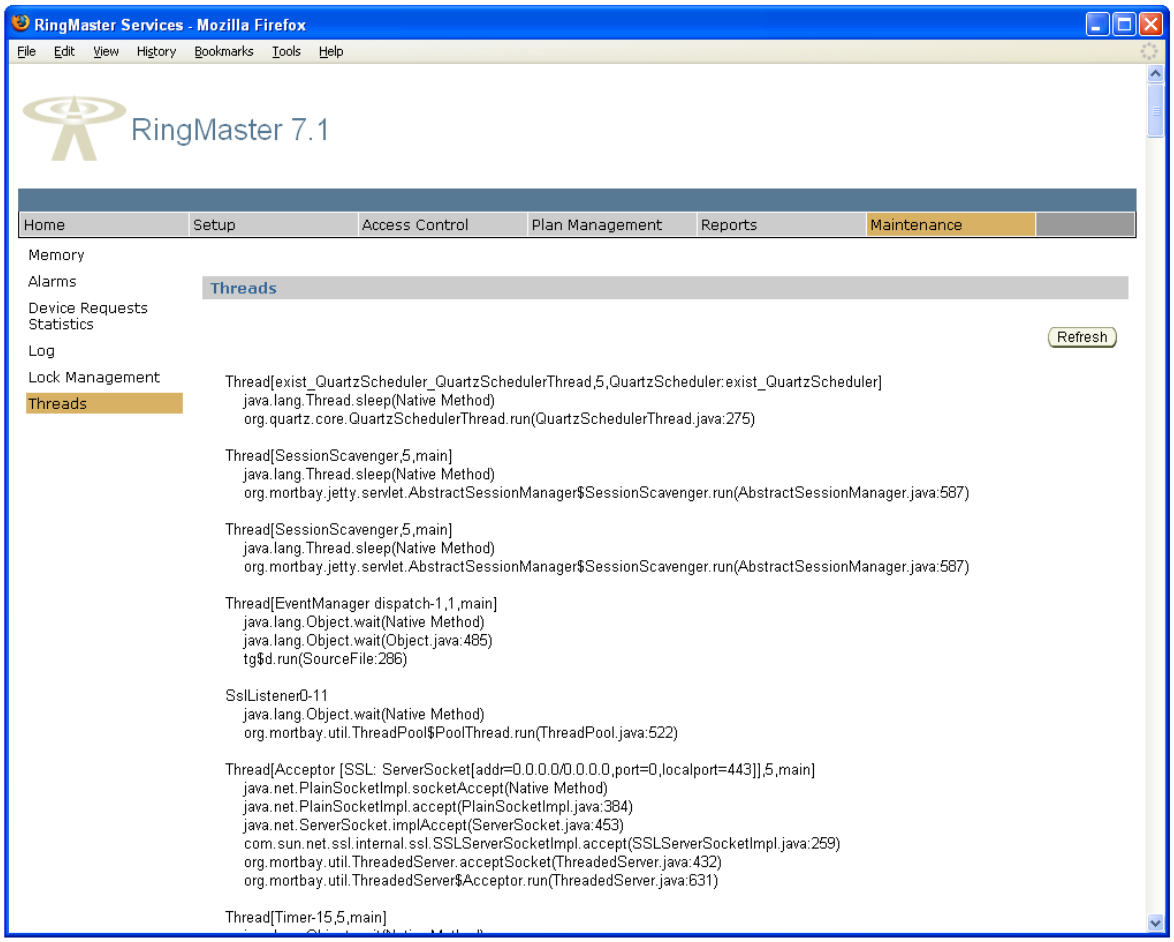
Threads

Select **Maintenance**, then select **Threads**.



This screen contains trouble shooting/debugging information on server threads that may be useful in working with TAC on any server problems you may encounter.

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RingMaster Client Preferences

This chapter describes how to change *RingMaster Client* preferences. You can set *RingMaster* preferences for a user session on the system on which *RingMaster* is installed. The preferences you set are valid only for that user on that system. Initial setting of *RingMaster Client* preferences is described in detail in “Setting Preferences” in the publication *RingMaster Planning Guide*. This chapter deals with updating and changing preferences.

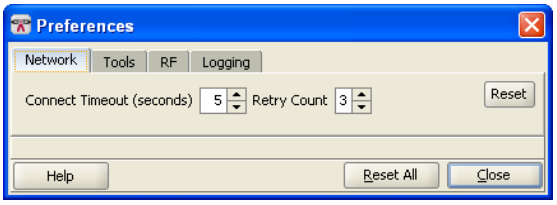
Preferences Values

To set or change *RingMaster* preferences, in the *RingMaster* main window, select **Tools > Preferences** and you will see a multi-tabbed **Preferences** dialog. Settings made with items on each of these tabs are described in the paragraphs below.

Network Options

To change network options:

1. Select **Tools > Preferences**. The **Preferences** dialog box appears.
2. Click the **Network** tab.



You can access these same settings as described above in **MX Connection Settings**.

3. To set the amount of time that *RingMaster* waits for a connection to be established to an MX before trying to connect again, specify the timeout (1 to 30 seconds) in the Connect Timeout box. The default is 5 seconds.
4. To set the number of times (0 to 5) *RingMaster* tries to reconnect to the MX after the original attempt, specify the value in the **Retry Count** field. The default is 3 times. For example, if the retry count is 3, *RingMaster* attempts to establish a connection to an MX four times. If you specify 0, *RingMaster* does not attempt to establish a connection if the first attempt is unsuccessful.
5. Click **Close** to close the **Preferences** dialog box, or click another tab to continue making changes.

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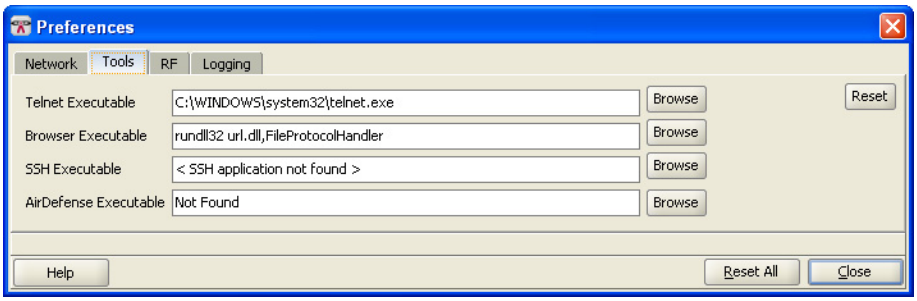
Tools Options

You can change the Telnet and Web browser applications that start from the *RingMaster* Tools menu. The default Telnet application is Microsoft Telnet Client. The default Web browser is Microsoft Internet Explorer.

To change tools options:

1. Select **Tools > Preferences**. The **Preferences** dialog box appears.
2. Click the **Tools** tab.



3. To change the Telnet executable file or location used by *RingMaster*, type the path of the executable file in the **Telnet Executable** field. For Windows systems, the default Telnet executable file is **C:\WINDOWS\system32\telnet.exe**. For *Linux* systems, the default is **/usr/bin/telnet**. For Macintosh systems, the default is **bin/sh telnet**. You can also click **Browse** to navigate a computer filesystem.
4. To change the Web browser executable file or location used by *RingMaster*, type the path of the executable file in the **Browser Executable** field. For Windows systems, the default Web browser executable file is **C:\Program Files\Internet Explorer\iexplore.exe**. For *Linux* systems, the default is **/usr/bin/mozilla**. For Macintosh systems, the default is open. You can also click **Browse** to navigate a computer filesystem.
5. Click **Close** to close the **Preferences** dialog box, or click another tab to make more changes.

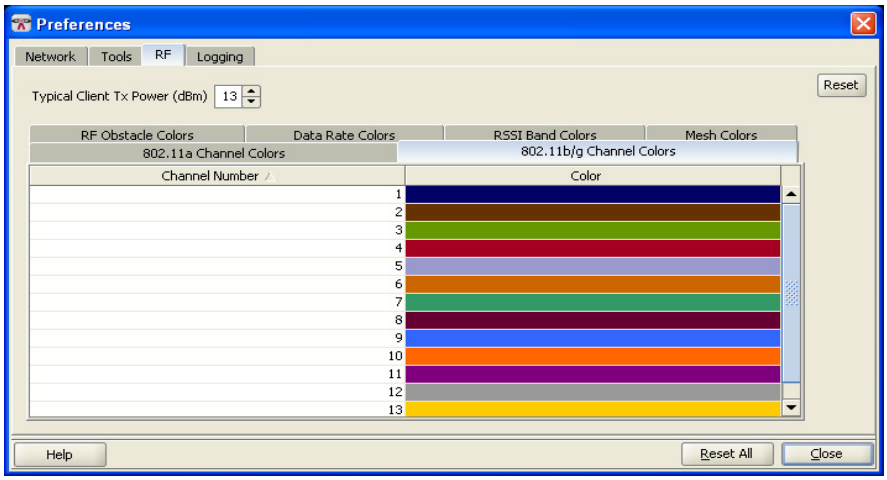
RF Options

You can change the following RF planning options:

- Typical transmit power for clients in the Trapeze network.
- Color schemes for showing RF information

To change the transmit power of a typical client:

1. Select **Tools > Preferences**. The **Preferences** dialog box appears.
2. Click the **RF** tab.



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3. In the **Typical Client Tx Power (dBm)** field, specify the typical transmit power (1 to 20 dBm) for clients in the network. The default is 13 dBm, a common client transmit power. If you want to choose a color for an RF technology or obstacle, see Changing Colors.

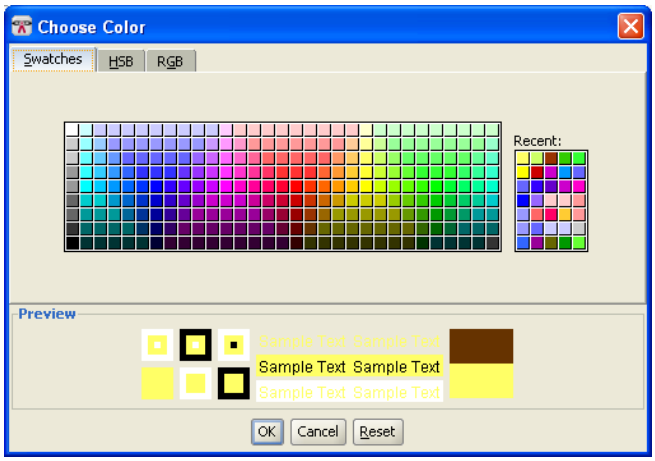
Selecting Colors

You can select color schemes by selecting tabs for the following types of RF information:

- **802.11a Channel Colors**
- **802.11b/g Channel Colors**
- **RF Obstacle Colors**
- **Data Rate Colors**
- **RSSI Band Colors** (Receive Signal Strength Indicator)
- **SNR Band Colors** (Signal-to-noise ratio)
- **Load Band Colors** (number of clients associated with a radio)
- **Probability Colors** (of a rogue device or client being in a specific location)
- **Mesh Colors**

For each scheme, you change a color using any of the following methods:

1. Select a color from a predefined palette. If you click on a color, the **Choose Color** dialog box appears.



   a. To specify a color using the color palette, click Swatches in the dialog box.
   b. From the color palette, click the color you want to see. Repeat until you find the color you want. In the Preview box, you can see the swatches and text in the color you chose. The Recent box shows the colors you have chosen so far. Click Reset to choose the original pre-defined color and clear the Recent field.
   c. Click OK to accept colors you chose. The RF tab in the Preferences dialog box is active.
   d. Do one of the following:
      - Change another color.
      - Click another **Preferences** tab.
      - Click **Close** to close the **Preferences** dialog box.

2. Define a Color by Changing HSB Properties. You can define colors by changing the hue, saturation, and brightness (HSB).
   - Hue is the color itself (for example, blue, orange, or purple). Hue is measured in degrees (0 to 360 degrees).
   - Saturation is the strength of the color. Saturation values are measured in percentages, with 0 percent indicating no color saturation (gray) and 100 percent indicating full saturation.
   - Brightness is the amount of light in the color. Brightness is also measured in percentages, with 0 percent indicating black and 100 percent indicating white.

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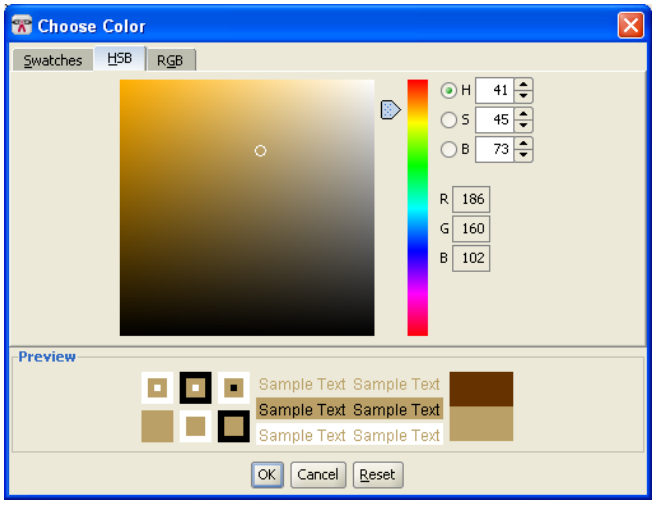
To specify a color by changing HSB:

a. Click HSB in the Choose Color dialog box.

b. To change a hue value, click the H radio button and do one of the following.

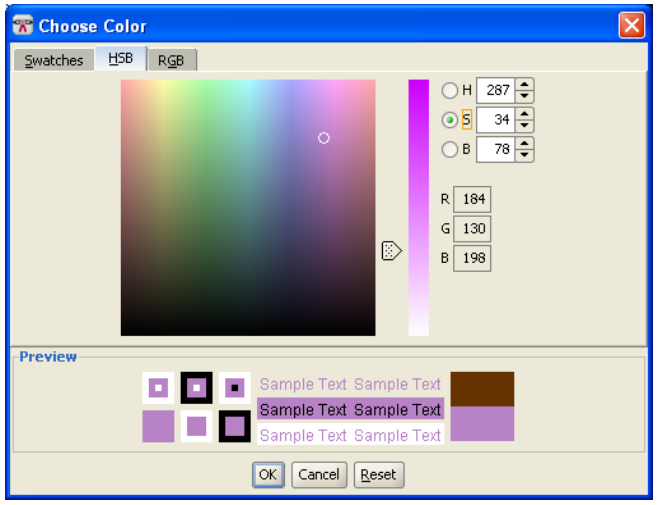


c. In the H field, specify a value between 0 and 360 degrees.

d. Use the slider to specify the hue value.

The color appears in the **Preview** field. You can also see the RGB equivalent in the **R, G**, and **B** fields next to the slider.

e. To change the saturation value, click the S radio button and do one of the following:



- Use sliders to specify color values.
- In the **S** selector box, specify a value between 0 and 100 percent.

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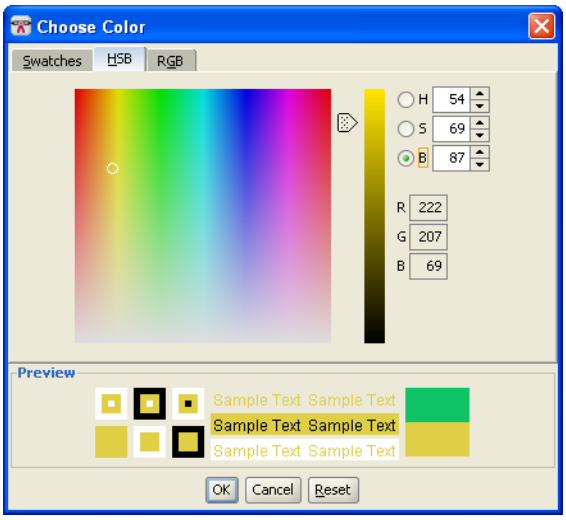
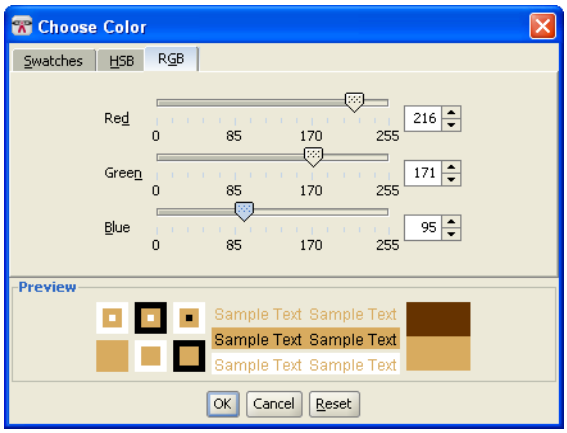
f. To change the brightness value, click the B radio button and do one of the following
   - In the **B** selector box, specify a value between 0 and 100 percent.
   - Use the slider to specify a brightness value.:



g. Click OK to accept a color.

3. You can define a color by changing Red, Green, and Blue (RGB) color properties. To specify a color by changing RGB:

   a. Click RGB in the Choose Color dialog box.



   b. Use the Red, Green, and Blue sliders to define a color. You can see a preview of the color in the Preview field.

   c. Click OK to accept a color.

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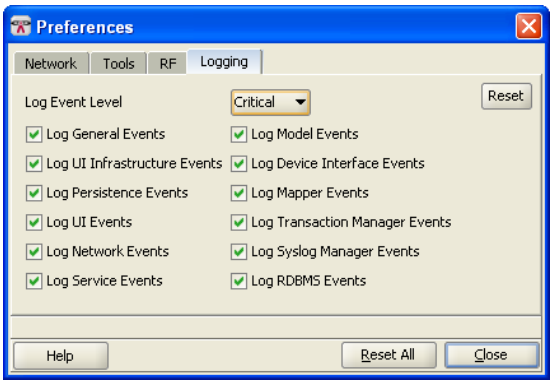
Logging Options

You can change the severity and type of *RingMaster* events logged. By default, event logging level is set to **Critical**, and all events are logged.

To change *RingMaster* logging options:

1. Select **Tools > Preferences**. The **Preferences** dialog box appears.
2. Click the **Logging** tab.



3. In the **Log Event Level** pull-down, select one of the following event levels:
   - **Critical** — A critical condition has occurred that requires immediate resolution.
   - **Warning** — An event that might require attention has occurred.
   - **Info** — Informational messages only. No action is required.
   - **Debug** — All events are shown, including debug messages.

---

4. There are check boxes that allow you to select items to be saved in reports generated by *RingMaster*. This includes the following:

- **Log General Events**
- **Log Model Events**
- **Log UI Infrastructure Events**
- **Log Device Interface Events**
- **Log Persistence Events**
- **Log Mapper Events**
- **Log UI Events**
- **Log Transaction Manager Events**
- **Log Network Events**
- **Log Syslog Manager Events**
- **Log Service Events**
- **Log RDBMS Events**

5. There are **Reset** and **Reset All** buttons to cancel changes or revert to default settings. Click **Close** to close the dialog box, or click another tab to continue making changes.

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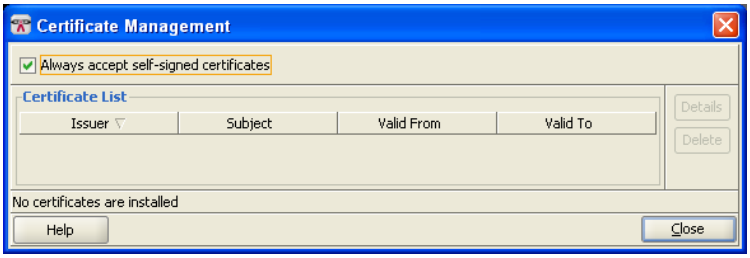
Certificate Management

By default, *RingMaster* does not accept self-signed certificates from MXs or from the monitoring service. You can change this option in the **Preferences** dialog box. (For more information about certificate handling, see **Certificate Check**.

To change certificate management options:

1. Select **Tools > Certificates**. The **Certificate Management** dialog box appears.



2. To automatically accept self-signed certificates, click to check the **Always accept self-signed certificates** checkbox. To clear this option, clear **Always accept self-signed certificates** checkbox. By default, this option is disabled. The *RingMaster Client* accepts a certificate only if it is signed by a Certificate Authority (CA). You see a list of certificates in use and have buttons to see **Details** and to **Delete**.

   Click **Close** to close the **Certificate Management** dialog box, or click another tab to continue making changes.

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Managing with RingMaster

This chapter provides information on deploying services — enabling services for wireless clients on a network. It also provides information about configuring MX management services and performing administrative tasks. For detailed information on performing administrative tasks on an MX, refer to "Configuring MX System Parameters" in the publication *RingMaster Configuration Guide*.

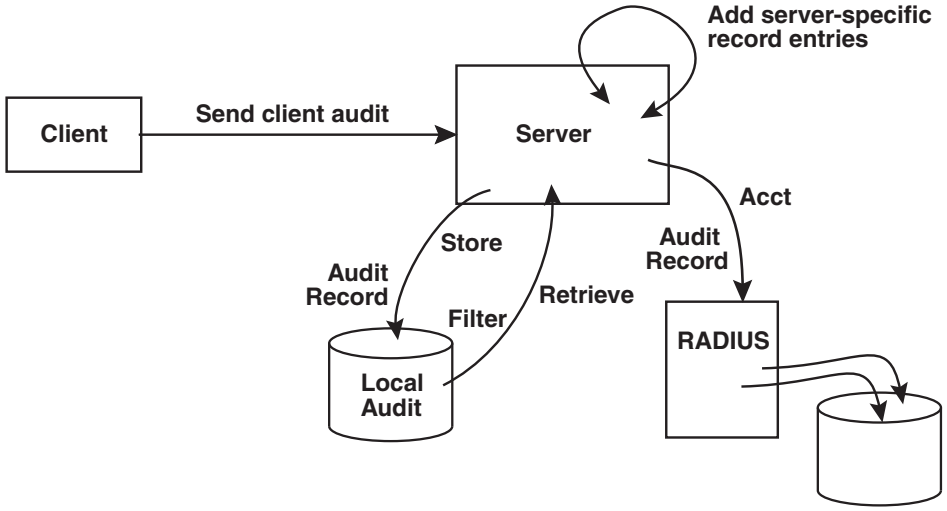
New Features in RingMaster

There are a number of new feature in *RingMaster* :

- **Database improvements in RingMaster Software**
  With the release of RingMaster Version 7.4, a new relational database is supported that allows you greater scalability with larger deployments of RingMaster. While this is transparent to you when you install this version, you should be aware of the changes as you upgrade your current version of RingMaster or perform a fresh installation of RingMaster.
- **Reporting Enhancements in RingMaster Software**
  You can now store reports on an FTP server in your network or store them locally.

Audit Trail

RingMaster Server software receives and stores audit records in an internal or external database. If a client sends a specific audit record to the server, the server extends an audit record with other information (session details, the system time, etc.) and stores the record in a database. Before storing records, the server adapts audit records based on their database format. The server retrieves audit entries from the database using a filter, then it sends these audit entries to a client to display them. A simple diagram for this flow is shown below:



Operations Tracked

Operations tracked in audit files include the following:

- Client actions that send a change set to the server
- Client actions that do not send a change to the server, and
- Server actions

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Client Actions Sent to Server

Client actions that send a Change Set to the server include one or more of the following:

- Finishing a Wizard (in **RF Planning**, **Policy**, **Configuration**, **Verification**, or **Alarm** views)
- Finishing a **Properties** dialog
- Pressing the **Save** button in the main window
- Deleting an object using a wizard or by pressing the **Delete** button in a form
- Perform a **Copy & Paste**
- **Uploading** an MX / **Creating** an MX / **Deleting** an MX
- Creating/Modifying/Deleting a **Policy**
- **Uploading** or **Creating** an MX with an existing policy

Client Actions Not Sent to Server

Client actions that do *not* send a Change Set to the server include one or more of the following:

- Deploying
- Image Installation
- Accepting Network changes
- Undoing Local Changes
- Undoing Network Changes
- Applying a Policy
- Scheduling a Deploy
- Scheduling an Image Upgrade
- Managing / Unmanaging a device

Server Actions

Server actions that send a Change Set to the server include one or more of the following:

- Server Deployment
- Server Image Installation
- Merging object cache / Finishing a transaction
- Performing XML transactions (**SET**, **DELETE**, **ACTION**)

User Entries

The user audit entry stores information about user names and roles (e.g. administrator, monitor).

Time and Date Entries

Time and Date audit entries contain information about the time when an operation occurred. They include the time zone by specifying an offset of minutes and hours.

External Database

RingMaster stores audit records in an external RADIUS server as accounting information. Therefore, *RingMaster* does not need to send accounting messages to a RADIUS server.

Radius Attribute Name	RADIUS Value	Field Value
Acct-Status-Type	40	Always set to STOP value
User-Name	1	The user name
Event-Timestamp	55	Timestamp of the event in UTC format
Calling-Station-Id	31	Ip address of the user

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Radius Attribute Name	RADIUS Value	Field Value
Acct-Session-Id	44	Unique accounting session id for each record
Acct-Multi-Session-Id	50	Unique value for a same user session
NAS-Port	5	TTY port or connection port used
NAS-Port-Type	61	Type of connection
NAS-IP-Address	4	MX Ip address
NAS-Identifier	32	Always set to "Trapeze"
Trapeze-Audit	13	A string VSA containing audit information

Access Control

In release 7.1, *RingMaster's* access control capabilities are improved. This version provides a more generic and flexible mechanism to allow you to set up access controls to meet specific operational needs. This allows you to partition a network according to your specific requirements and define which functions each type of user has authority to access in specific areas of a network.

Refer to the publication *RingMaster Configuration Guide* for details on setting up Access Control for your network.

Data Model

Setting up access control begins by defining a User Group. You are no longer limited to three pre-defined User types — administrator, provisioning user, and monitor user. After creating a user group, privileges for that group can be associated with various sets of objects in a plan. For example, you can assign configuration editing privileges for a specific MobilityDomain and its associated member devices. After associating privileges for a set of objects to a user group, users can be assigned to the group. Assigned users acquire the group's privileges in the plan.

Object Group

An Object Group identifies a set of objects in a plan. Object Groups are defined as part of assigning privileges to a user group. A separate object group is defined for each privilege type assigned to a user group. An object group is bound to the user group for which it was originally created. The set of objects an object group refers to can be referenced by other object groups.

The following types of objects may be added to an object group:

- Network Plan
- MX
- Mobility Domain
- Site
- Building
- Floor
- Location Group
- Equipment Group

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Only two objects may be added to an object group. Furthermore, if two objects are choosen, each must be of a different category as shown below (i.e. only one object per category).

- Location-related objects
  - Location group
  - Site
  - Building
  - Floor
- Equipment-related objects
  - Equipment group
  - Mobility Domain
  - MX

Privileges

The following privileges may be assigned to a user group:

- Viewing of configuration data
- Editing of configuration data
- Viewing of monitoring data
- Server administration

User

Users are global entities shared across all plans. Their associations to user groups are maintained across plans. A user can only be assigned to a single user group.

User Privileges

There are changes to user privileges for various views as detailed in the next paragraphs.

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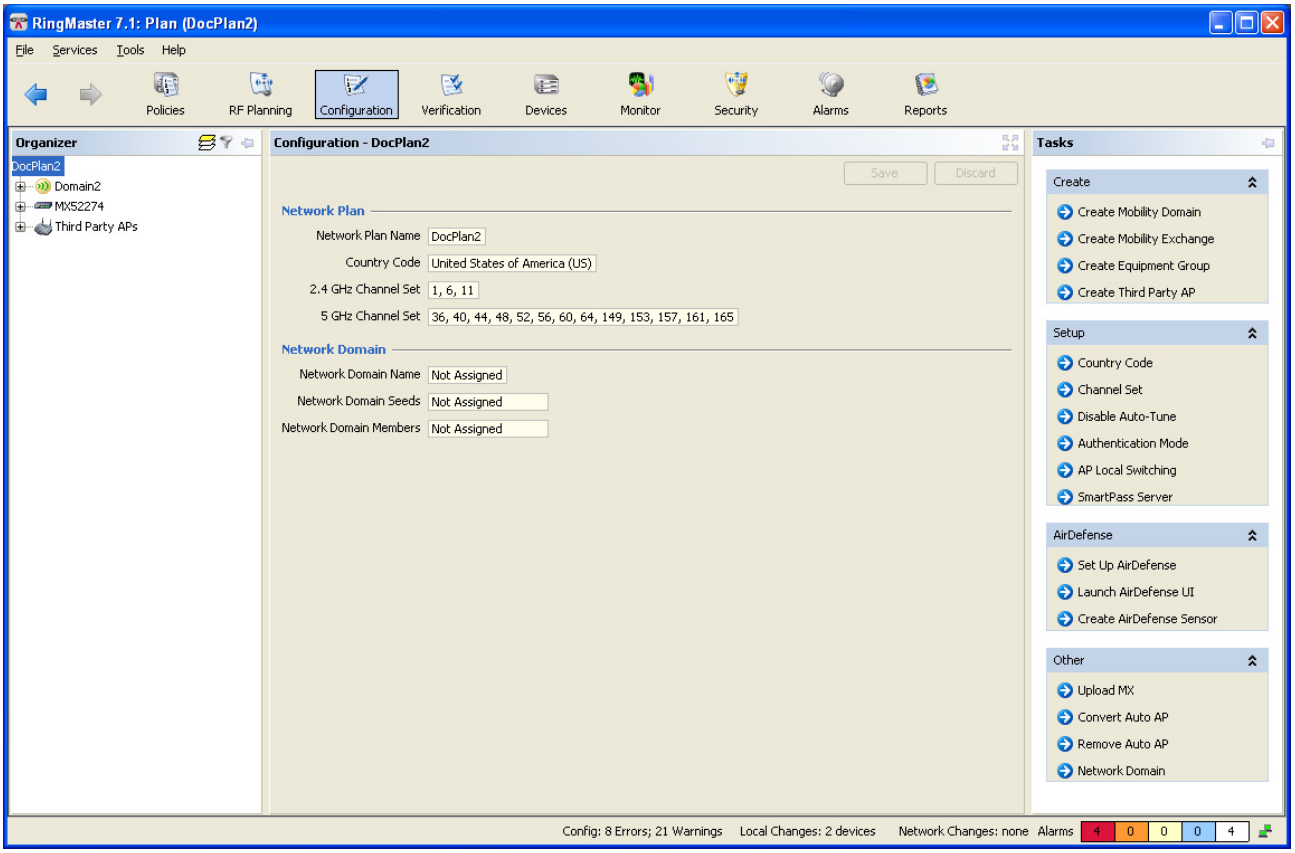
Configuration/RF Planning View

Privileges to view and edit configuration data are assigned to groups of objects in a plan. If a user does not have viewing privileges for an object, that object will not appear in the organizer tree. Configuration viewing privileges do not affect what is displayed in monitoring views. Monitoring is a separate privilege. This allows an administrator to set up users whose primary role is for monitoring only.

Organizer Tree



When a user switches to the configuration view, the root object in the organizer tree is the single object (in the object group) associated with the configuration viewing privilege for that user's assigned user group (as shown in the example screen below).

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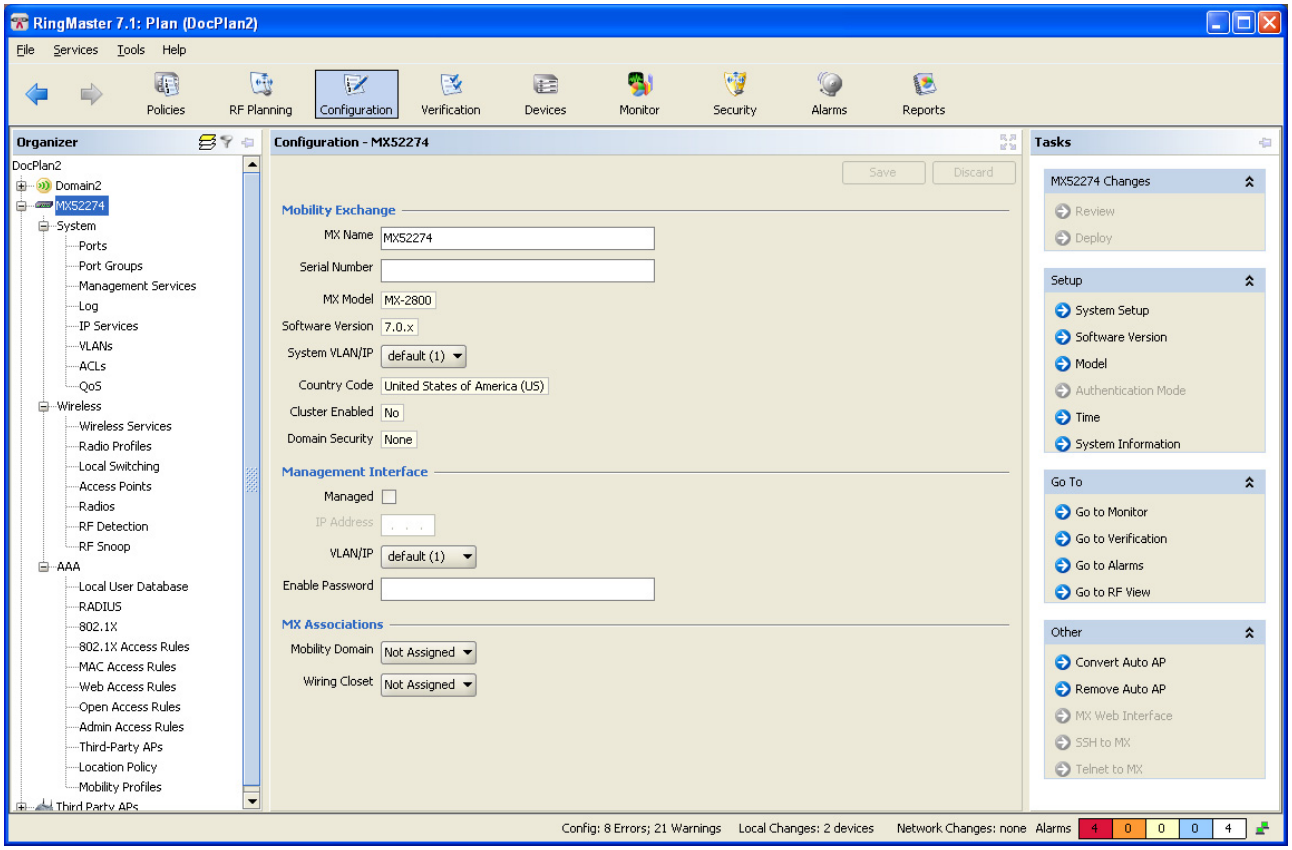

Object Editing

If a user does not have editing privileges for an object, all tasks involving modifications to that object are unavailable. All configuration data input fields for that object are disabled in the main details panel. In some cases, a user may have editing privileges for an object, but a change causes a modification of some other object that they are not privileged to edit. In this case, the change and all other side effect changes involved in the transaction are rejected. An error message is dosplayed, informing the user of an access control violation.

Configuration Tasks

Available configuration tasks include:

- NetworkPlan
  - Create Mobility Domain
  - Create Mobility Exchange
  - Create Equipment Group
  - Create Third Party AP
  - Country Code
  - Channel Set
  - Disable Auto-Tune
  - Authentication Mode
  - AP Local Switching
  - SmartPass Server
  - Set Up AirDefense
  - Launch AirDefense UI
  - Create AirDefense Sensor

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- Upload MX
- Convert Auto AP
- Remove Auto AP
- Network Domain

- MobilityDomain
  - Mobility Exchange
  - Create Equipment Group
  - Setup MX-MX Security
  - AP Signature
  - AP Redundancy
  - Add Members to Cluster
  - Remove Members from Cluster
  - Remove Secondary Seed
  - Delete cluster
  - Upload MX
- MX
  - Review
  - Deploy
  - System Setup
  - Software Version
  - Model
  - Authentication Mode
  - Time
  - System Information
  - Add to Cluster
  - Go to Monitor
  - Go to Verification
  - Go to Alarms
  - Go to RF View
- Third Party APs
  - Create Third Party AP
  - Create Ignore List Entry

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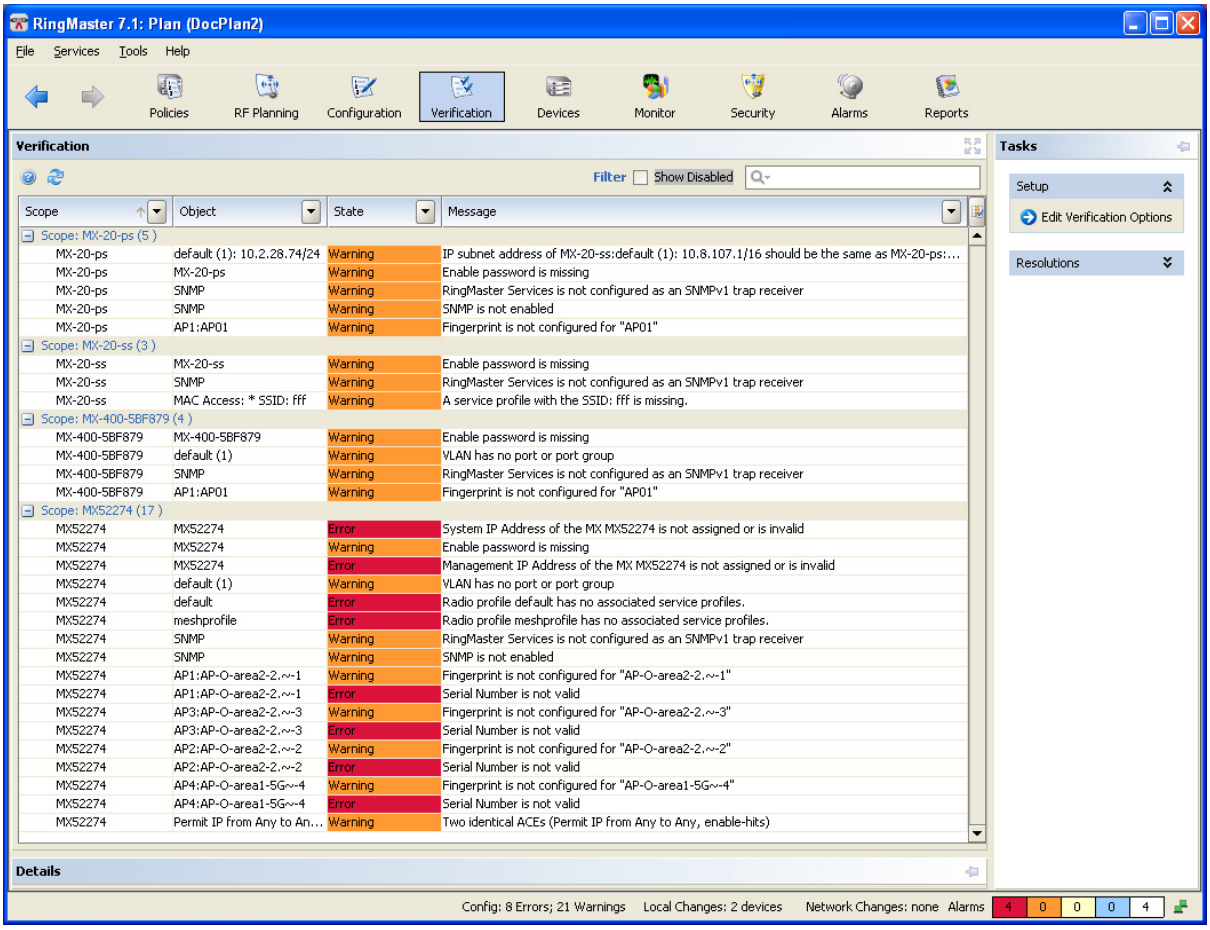
Verification View

The **Verification** view displays information on objects for which a user has configuration viewing privileges. Summary counts displayed on the status line at the bottom of the main screen are based on access control-filtered results. Resolutions are disabled if a user does not have editing privileges for an associated object. Verification options setup requires server administration privileges.


RingMaster 7.1: Plan (DocPlan2)
File Services Tools Help
Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Verification
Filter Show Disabled
Scope Object State Message
Scope: MX-20-ps (5)
MX-20-ps default (1): 10.2.28.74/24 Warning IP subnet address of MX-20-ss:default (1): 10.8.107.1/16 should be the same as MX-20-ps:...
MX-20-ps MX-20-ps Warning Enable password is missing
MX-20-ps SNMP Warning RingMaster Services is not configured as an SNMPv1 trap receiver
MX-20-ps SNMP Warning SNMP is not enabled
MX-20-ps AP1:AP01 Warning Fingerprint is not configured for "AP01"
Scope: MX-20-ss (3)
MX-20-ss MX-20-ss Warning Enable password is missing
MX-20-ss SNMP Warning RingMaster Services is not configured as an SNMPv1 trap receiver
MX-20-ss MAC Access: * SSID: fff Warning A service profile with the SSID: fff is missing.
Scope: MX-400-5BF879 (4)
MX-400-5BF879 MX-400-5BF879 Warning Enable password is missing
MX-400-5BF879 default (1) Warning VLAN has no port or port group
MX-400-5BF879 SNMP Warning RingMaster Services is not configured as an SNMPv1 trap receiver
MX-400-5BF879 AP1:AP01 Warning Fingerprint is not configured for "AP01"
Scope: MX52274 (17)
MX52274 MX52274 Error System IP Address of the MX MX52274 is not assigned or is invalid
MX52274 MX52274 Warning Enable password is missing
MX52274 MX52274 Error Management IP Address of the MX MX52274 is not assigned or is invalid
MX52274 default (1) Warning VLAN has no port or port group
MX52274 default Error Radio profile default has no associated service profiles.
MX52274 meshprofile Error Radio profile meshprofile has no associated service profiles.
MX52274 SNMP Warning RingMaster Services is not configured as an SNMPv1 trap receiver
MX52274 SNMP Warning SNMP is not enabled
MX52274 AP1:AP-O-area2-2.~-1 Warning Fingerprint is not configured for "AP-O-area2-2.~-1"
MX52274 AP1:AP-O-area2-2.~-1 Error Serial Number is not valid
MX52274 AP3:AP-O-area2-2.~-3 Warning Fingerprint is not configured for "AP-O-area2-2.~-3"
MX52274 AP3:AP-O-area2-2.~-3 Error Serial Number is not valid
MX52274 AP2:AP-O-area2-2.~-2 Warning Fingerprint is not configured for "AP-O-area2-2.~-2"
MX52274 AP2:AP-O-area2-2.~-2 Error Serial Number is not valid
MX52274 AP4:AP-O-area1-5G~-4 Warning Fingerprint is not configured for "AP-O-area1-5G~-4"
MX52274 AP4:AP-O-area1-5G~-4 Error Serial Number is not valid
MX52274 Permit IP from Any to An... Warning Two identical ACEs (Permit IP from Any to Any, enable-hits)
Details
Tasks
Setup
Edit Verification Options
Resolutions
Config: 8 Errors; 21 Warnings Local Changes: 2 devices Network Changes: none Alarms 4 0 0 0 4

Policy View

Access control for a policy object is derived based on the specific policy's set of associated devices. Users having viewing privileges for at least one of a policy's associated devices will be allowed to view the policy's configuration data. To create, delete, or edit a policy, a user must have edit privileges for the entire plan. This is required because, once a policy is created, it can result in automatic device configuration changes. This can occur whenever a device is created or uploaded. As part of these operations, the system searches for policies that match a device's model and version. The base configuration of these matching policy objects is automatically applied to the new device. To associate a new device with a policy, a user edits the privileges for the device being associated. In order to apply policy changes to member devices, a user must have edit privileges for all of the policy's associated devices. A user will only be allowed to review policy changes for the set of devices for which they have configuration viewing privileges.

Devices View

The set of MXs displayed in a devices view is based on a user's configuration viewing privileges. The ability to invoke tasks for selected devices may require additional privileges. The table below lists these requirements. The **MX Credentials** column is used to indicate that, in addition to *RingMaster* privileges, the user must also provide a valid username/password for the target MX. By default, the user's *RingMaster* credentials are used.

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Task	Required Privilege for Device		
	Config. Viewing	Config. Editing	MX Credentials
Review Local Changes	•		
Deploy		•	•
Undo Local Changes		•	
Review Network Changes	•		
Accept Network Changes		•	
Undo Network Changes		•	
Go to Configuration	•		
Go to Verification	•		
Refresh	•		
Upload MX			
View Operations Log	•		
Image Install		•	•
Reboot MX			•
Manage/Unmanage		•	
Distribute Certificates			•
Image Repository		•	

Reports View

Access to certain reports requires configuration data viewing privileges. When generating reports, a user must select a scope. All scope types are available for selection, but object instances for each type are limited to those for which the user has access. A user must have configuration viewing privileges for an object as a whole in order for an object to appear in the selection list. In addition to report generation, access control is enforced for the set of pre-existing reports available for viewing. For each report stored on the server, information is maintained regarding the set of objects represented in the report. If a user attempts to view a pre-existing report, a check is performed to ensure the user has configuration viewing privileges for the complete set of referenced objects.

The reports shown below require configuration data viewing privileges. Access to other reports will be based on monitoring privileges.

Report	Available Search Scopes
Inventory	NetworkPlan, MobilityDomain
Mobility Domain Configuration	MobilityDomain

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Report	Available Search Scopes
MX Configuration	MX
Site Survey Order, Work Order	NetworkPlan, Site, OutdoorArea ,Building, Floor

Monitoring Privileges

The ability to view monitoring data for objects in a plan is a separate privilege that must be assigned to a user group explicitly. The privilege to view configuration data does not imply monitoring access. Likewise, monitoring access does not imply the ability to view configuration data.

Organizer Tree

When a user switches to the **Monitoring** view, the root object in the organizer tree is the single object (in the object group) associated with the monitoring viewing privilege for that user's assigned user group. By setting the organizer root node this way, a user always has full monitoring privileges for everything in the tree. This avoids the complexity of calculating access control-filtered monitoring results for nodes in the tree for which the user has only partial access.

Find Clients

The **Find Clients** task is launchable from the client panel in the status summary tab as well as from the **Client Details** monitor tab. When a task is invoked, a dialog appears with the current scope object pre-selected as the initial search criteria. To enforce access control restrictions, the ability to change this search scope to some other object in the plan is removed.

Find RFID Tag

The **Find RFID Tag** task is launchable from the **Client Details** monitor tab. This task is always present, regardless of the organizer tree's current scope selection. The dialog for this task contains controls to search a specific MobilityDomain or a specific device. Similar to the Find Clients task, this dialog allows you to change search criteria to an object different from the current tree selection. To prevent users from invoking searches against devices for which they do not have monitoring privileges, this task is only available in the context of a MobilityDomain or device tree selection. Users are not be allowed to alter pre-selected scope values in the dialog.

Report Tasks

The **Client**, **Traffic**, and **Radio Monitor** tabs contain tasks that generate reports related to particular areas of monitoring. When a task's dialog is launched, the current tree object is pre-selected in the search criteria fields. Users are allowed to change to some other object in the plan. These dialogs do not allow pre-selected values to be altered.

Aalarms View

The **Alarms** view displays alarms for objects in a user's allowed monitoring set. Alarm counts on the summary line at the bottom of the frame reflect this. The alarm query function restricts the scopes by which a user is allowed to search. In the dialog used to enter search criteria, the scope type field contains possible values. Upon selection, however, the instance field only contains selections for objects in a user's allowed monitoring set.

Security View

The **Security** view previously provided a Network Plan-wide view of rogues and their associated clients. This information is based on certain types of alarms raised against device objects. This view is changed so it only displays information based on alarms raised against devices in a user's allowed monitoring set.

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Reports View

Tasks available in **Reports** are based a user's privileges and limits the generation and viewing of reports. The following reports are based on a user's monitoring privileges:

Report	Available Search Scopes	Notes
Client Summary, Client Errors	NetworkPlan, MobilityDomain, MX, Site, OutdoorArea, Building, Floor, CoverageArea	
Client Details		Dialog only prompts for username, IP address, and client MAC as search criteria. Report generation logic needs to filter the results to only display the clients associated with the set of devices per user has privileges.
Top APs	NetworkPlan, MobilityDomain, MX, Site, OutdoorArea, Building, Floor	
Network Usage (Port Traffic)	NetworkPlan, MobilityDomain, MX	
Network Usage (Radio Traffic)	NetworkPlan, MobilityDomain, Site, Building, Floor, AP, Radio	
Rogue Details		Dialog only prompts for MAC address. Report generation logic should filter the results to only display rogue information if it was detected by a device in the user's allowed monitoring set.
RF Summary	Site, OutdoorArea, Building, Floor, AP, Radio	
Security		Dialog does not prompt for any search criteria. Report generation logic should filter the results to only display information related to the devices in the user's allowed monitoring set.
Radio Details	Radio	
Rogue Summary, Alarm Summary, Alarm History	NetworkPlan, MobilityDomain, Site, OutdoorArea, Building, Floor	
Client OUI		Dialog does not prompt for any search criteria. ISSUE: What type of filtering needs to be done?

Web Pages

Access Control web pages support configuration for:

- User,
- User Group, and
- Radius Servers

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On the **Access Control** Web page you can enable or disable Access Control functionality. You can perform user operations on this page. On the **RADIUS Servers** page you can set up the parameters for RADIUS Servers.

Grouping

As networks continue to scale, the need for a network partitioning feature grows. With larger installations, responsibility for managing a network is distributed among individuals, where each one is concerned only with a particular subset of the overall network. The way networks are partitioned is dependent on the structure of the associated business. It may be physical location-oriented (e.g. a group of Sites), or it may be more logical (e.g. department-oriented).

This feature provides a user flexibility to partition a network in a way that matches their organization and their IT support group. The access control feature provides an ability for an administrator to assign privileges to various entities throughout a network. Network partitioning provides a way of identifying entities at a high level, rather than individually.

Refer to the publication *RingMaster Configuration Guide* for details on setting up Groups for your network.

Object Groups

Two types of object grouping schemes are supported:

- Equipment groups, and
- Location groups.

There is no direct relation between these two and users may choose to use both, just one, or no grouping scheme at all.

Equipment Group

An equipment group can contain the following types of objects:

- **MobilityDomain** – All member devices are implicitly included as equipment group members.
- **Standalone MX** – A device not associated with a MobilityDomain
- **MobilityDomain member MX** – A device associated with a MobilityDomain where the MobilityDomain as a whole is not a member of the equipment group.

Equipment groups can be created under a top-level plan object, or under a MobilityDomain.

Organizer

The equipment organizer tree is enhanced to support the concept of equipment groups. Equipment group nodes appear in the tree to contain associated device and/or MobilityDomain members. Device nodes hang directly under an equipment group node, unless a device's Mobility Domain is a member of the group. Selecting a device node, reveals any MobilityDomain membership information in the configuration view's detail panel.

Cluster Configuration

Whenever a Mobility Domain is cluster-enabled, an associated Cluster node will appear in the organizer. This node will contain the cluster's seeds, members, and the DomainConfiguration node. The following example illustrates a simple case involving no equipment groups. A MobilityDomain's cluster node may appear multiple times in the tree. There is no method for assigning a cluster as a whole to an equipment group. Only devices and MobilityDomains can be assigned to a group. One restriction is enforced regarding assignment of devices to equipment groups, which is that, if a device is a cluster seed, the other cluster seed must also be assigned to the same equipment group. This is required to ensure that a deploy target switchover will not to be rejected due to access control restrictions.

Flat View

The organizer is enhanced to provide a context-sensitive "flatten" operation that can be invoked on group nodes. This transforms a selected subtree into a flat list of immediate child nodes. Child node

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labels include the labels of all collapsed parent nodes, separated by a "**:**" character. Only members of the equipment group will be represented as child nodes.

Group Creation

Equipment groups are created in the configuration view by selecting a top-level plan object or a MobilityDomain object and invoking a **Create Group** task. This opens a dialog where you assign a name to the group and select objects to become members.

Location Group

A location group is used to group RF planning-related objects. A location group is limited to Site containment. In future releases, this may be enhanced to allow individual buildings, floors, outdoor areas, coverage areas, and placed AP to be added to a location group.

Group Usage

Monitoring View

Support for equipment groups and location groups has been added to the **Monitoring** view. Location and equipment groups are represented in the monitoring view's organizer. The tree nodes for these objects provide a scope for displaying group-specific aggregated monitoring data. The monitoring view organizer provides a way to inhibit the display of group objects in the tree. The organizer contains a toggle button to control whether or not group nodes are displayed.

Client Monitor

The **Client Summary** view is enhanced to provide a **Clients by Location Group** option when a plan object is the selected scope in the **Sites** organizer. If the organizer is in **Equipment** mode, a **Clients by Equipment Group** option is provided when the plan object is the selected scope. The **Find Clients** function is enhanced to provide searching by a location group or equipment group

Reporting

The scope selection feature in the reporting module supports the new location and equipment group objects. The table below lists each type of report and the type of support that has been added.

Report Type	Report Type	New Su Equipm nt Grou
Inventory	Network Plan, Mobility Domain	Y
Mobility Domain Configuration	Mobility Domain	
MX Configuration	Mobility Exchange	
Client Summary	Network Plan, Mobility Domain, Mobility Exchange, Site, Outdoor Area, Building, Floor, Coverage Area	Y
Client Details		
Client Errors	Network Plan, Mobility Domain, Mobility Exchange, Site, Outdoor Area, Building, Floor, Coverage Area	Y
Top APs	Network Plan, Mobility Domain, Mobility Exchange, Site, Outdoor Area, Building, Floor	Y
Network Usage (Port Traffic)	Network Plan, Mobility Domain, Mobility Exchange	Y

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Report Type	Report Type	New Su Equipm nt Grou
Network Usage (Radio Traffic)	Network Plan, Mobility Domain, Site, Building, Floor, AP, Radio	Y
RF Summary	Site, Outdoor Area, Building, Floor, AP, Radio	
Radio Details	Radio	
Rogue Summary	Network Plan, Mobility Domain, Site, Outdoor Area, Building, Floor	Y
Rogue Details		
Alarm Summary	Network Plan, Mobility Domain, Site, Outdoor Area, Building, Floor	Y
Alarm History	Network Plan, Mobility Domain, Site, Outdoor Area, Building, Floor	Y
Security		
Client OUI		
Site Survey Order	Network Plan, Site, Building, Floor, Outdoor Area	
Work Order	Network Plan, Site, Building, Floor, Outdoor Area	

Alarm Queries

The query feature in the **Alarms** view is enhanced to support filtering by instances of equipment group or location group.

RADIUS Authentication

Currently, *RingMaster* uses basic authentication in which user names and passwords are stored in a local data store. In addition, RADIUS-based authentication is supported by *RingMaster*.

A new option is available to enable RADIUS Authentication. If this option is enabled, a user must provide the following RADIUS server information:

- IP Address
- Key
- Port (default 1812)
- Timeout (default 5 seconds)
- Retry Count (default 3 retries)

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Users can configure one primary RADIUS server and one secondary RADIUS server globally, across all network plans. If a user is successfully authenticated, the RADIUS server will send an Access Accept response. This response will contain a custom VSA (Trpz-RM-User-Group) for the user group to which the user belongs. *RingMaster* software restricts user access based on the user group returned by the RADIUS Server. If RADIUS authentication is enabled, users must specify a default user group. This user group is used if the RADIUS server does not return a VSA. If the RADIUS server returns an invalid VSA, user access is rejected.

The administrator is able to configure local users. This is optional. Administrators can provision a user and not have to wait until the user is added to a central RADIUS server. Any user trying to connect to the *RingMaster Server* is first authenticated locally. If local authentication fails, the user is authenticated using the configured RADIUS server. If access control is enabled, there should be at least one user configured locally. This ensurse that a user can access *RingMaster* even if the RADIUS server is unreachable.

RingMaster Server RM-200

The RM-200 platform provides a means of choosing between RADIUS-based authentication and its current local authentication with regards to its Web and CLI platform management interfaces.

Managing the LA-200E

With the acquisition of Newbury Networks, the LA-200E is now a premier product for Trapeze Networks. Integrating the LA-200E with RingMaster allows you to manage an LA-200E using network management software. After adding the LA-200E to your network plan, you can manage, plan, and configure RFID listening APs from a central server.

The integration of the LA-200E into RingMaster is supported by software version 6.4.1 or higher on the LA-200E.

Adding a Managed LA-200E to RingMaster

To add an LA-200E to RingMaster, you must install an LA-200E in your wiring closet or have it located somewhere in your network. After installation, you need the following information to add the LA-200E to RingMaster:

- **IP Address**
- **User Name**
- **Password**

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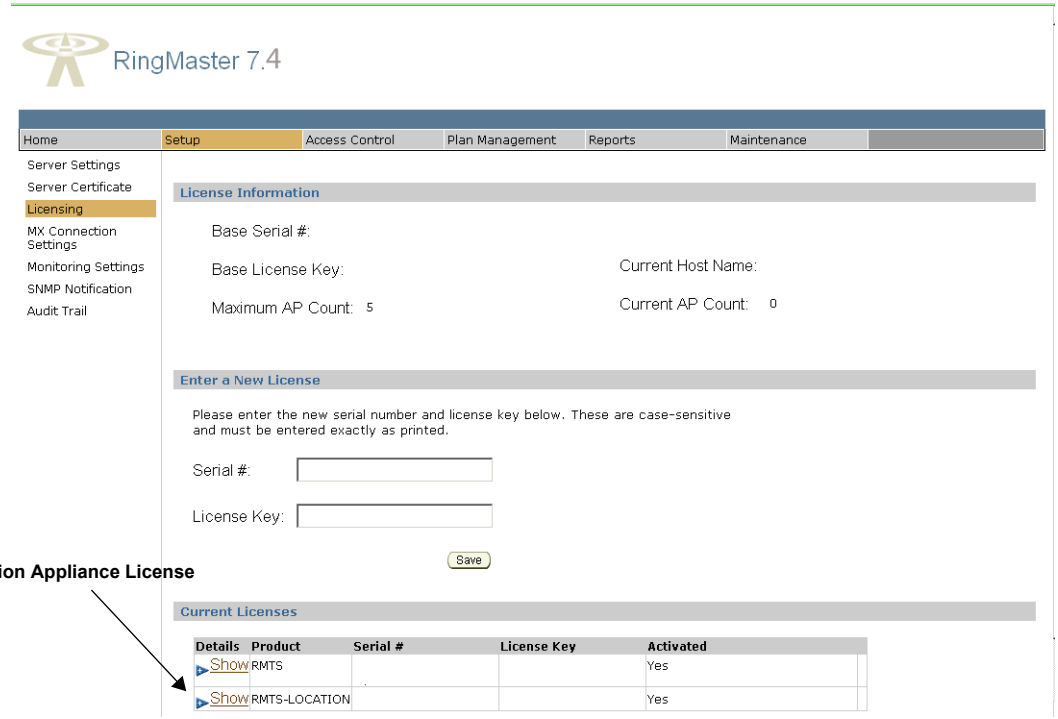
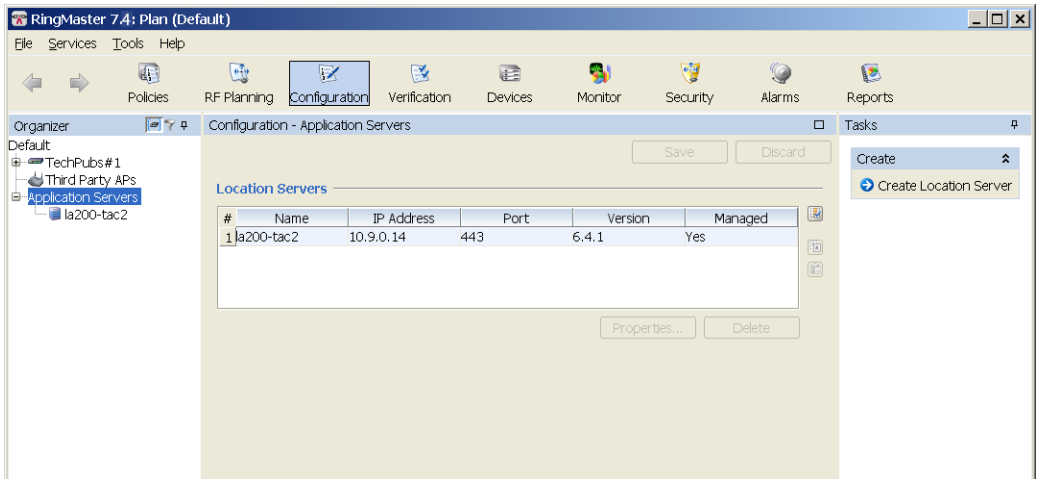
You also need a Location Appliance license in order to activate the feature in RingMaster. After installing the license, the **Create Location Server** task is available in the RingMaster interface.



RingMaster 7.4 with an activated Location Appliance license.



To add an LA-200E to RingMaster, follow these steps:

1. Open RingMaster and click **Configuration** from the menu bar.
2. From the **Organizer** panel, select **Application Servers**.

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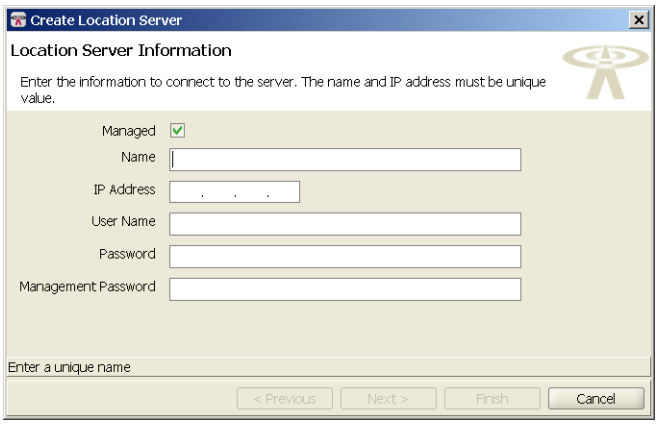
3. From the **Task** list, select **Create Location Server** and the associated wizard opens.



4. Select **Managed** to allow RingMaster to manage the location appliance.
5. In the **Name** field, enter the name of the LA-200E.
6. Enter the IP address.
7. Enter the User Name.
8. Enter the Password.
9. If there is a management password, enter the password in the **Management Password** field.
10. Click **Next**. RingMaster connects to the LA-200E and establishes a connection.
11. Click **Finish** to complete the configuration.

The LA-200E now appears in the **Organizer** panel under **Application Servers**.

To review LA-200E settings, highlight the Location Appliance in the list and click **Properties**. You can then change any of the original settings for the server.

Available Tasks for All Managed LA-200E Location Appliances

There is a list of available tasks for all location appliances managed by RingMaster. You can select any of the following tasks:

- **Create Location Server**
- **Setup Synchronization Parameters**
- **Edit a Location Server**
- **Configure a Snoop Filter**
- **Configure SNMP Settings**

From the **Other** List, you can select from the following tasks:

- **Platform Management**
- **Appliance Logs**
- **Backup and Restore**
- **Configuration**
- **Factory Reset**
- **Schedule Reboot**
- **System Update**
- **User Management**

Selecting any of the **Other** tasks opens the corresponding software feature on the location appliance. For more information on using these features, refer to the *Trapeze Networks LA-200E User's Guide*.

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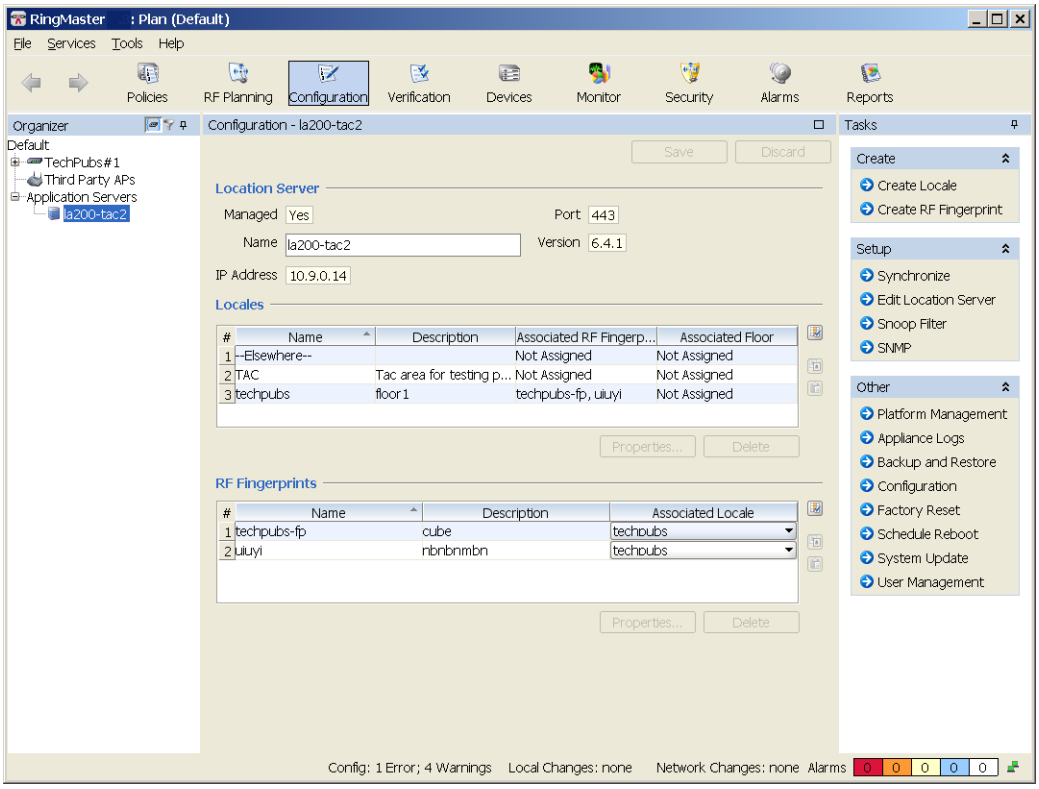
Available Location Appliance Tasks

If the location appliance already has a configuration, the details are displayed when you select the LA-200E in the Organizer panel.



After it is selected, the following information is displayed:

- **Location Server**
- **Managed**
- **Name**
- **Port**
- **Version**
- **IP Address**
- **Locales**
- **Name**
- **Description**
- **Associated Fingerprints**
- **Associated Floor**
- **RF Fingerprints**
- **Name**
- **Description**
- **Associated Locale**

In the **Tasks** panel, you can select from a list of available tasks. Under **Create**, you can select

- **Create Locale**
- **Create RF Fingerprint**

Under **Setup**, you can select

- **Synchronize**
- **Edit Location Server**

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- **Snoop Filter**
- **SNMP**

Under **Other**, you can select

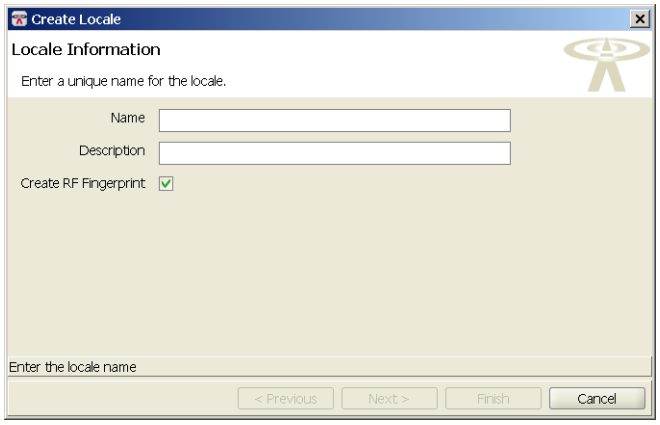
- **Platform Management**
- **Appliance Logs**
- **Backup and Restore**
- **Configuration**
- **Factory Reset**
- **Schedule Reboot**
- **System Update**
- **User Management**

Selecting any tasks under **Other**, opens the operating system of the location appliance and you can perform any of these tasks directly on the location appliance.

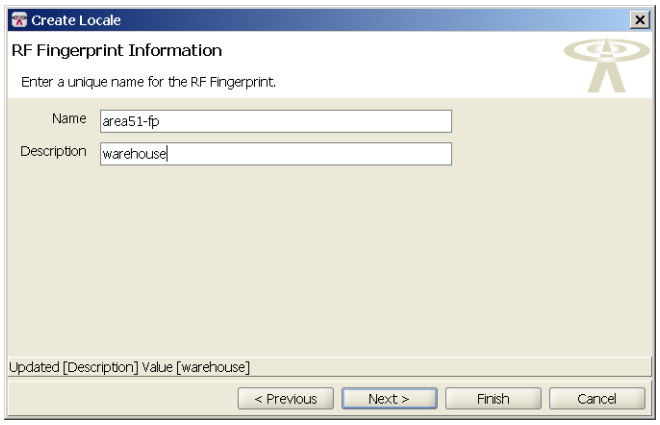
Creating Locales Using RingMaster

Select an LA-200E from the **Application Servers** list in the **Organizer** panel. The **Task** list is now populated with available tasks to perform on the location appliance. To create a locale, use the following steps:

1. Under **Create**, click **Create Locale**. The **Create Locale Wizard** is displayed.



2. Enter the name and description of the locale in the appropriate fields. **Create RF Fingerprint** is selected by default. If you do not want to create an RF Fingerprint, clear the checkbox. If you are also using Active Asset on the location appliance, you must follow a specific format for the description. The format is Campus:Building:Floor. Click **Next**.



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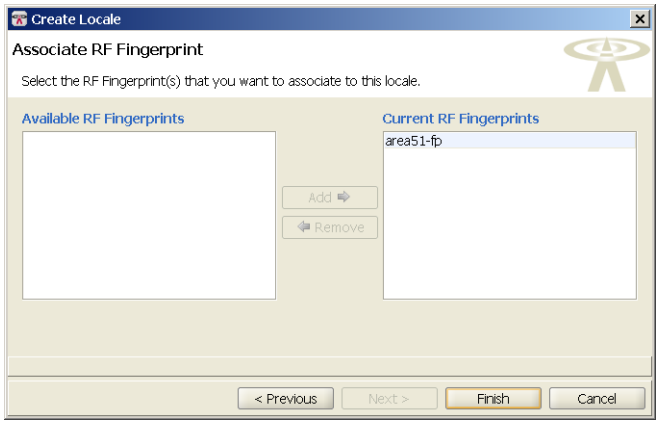
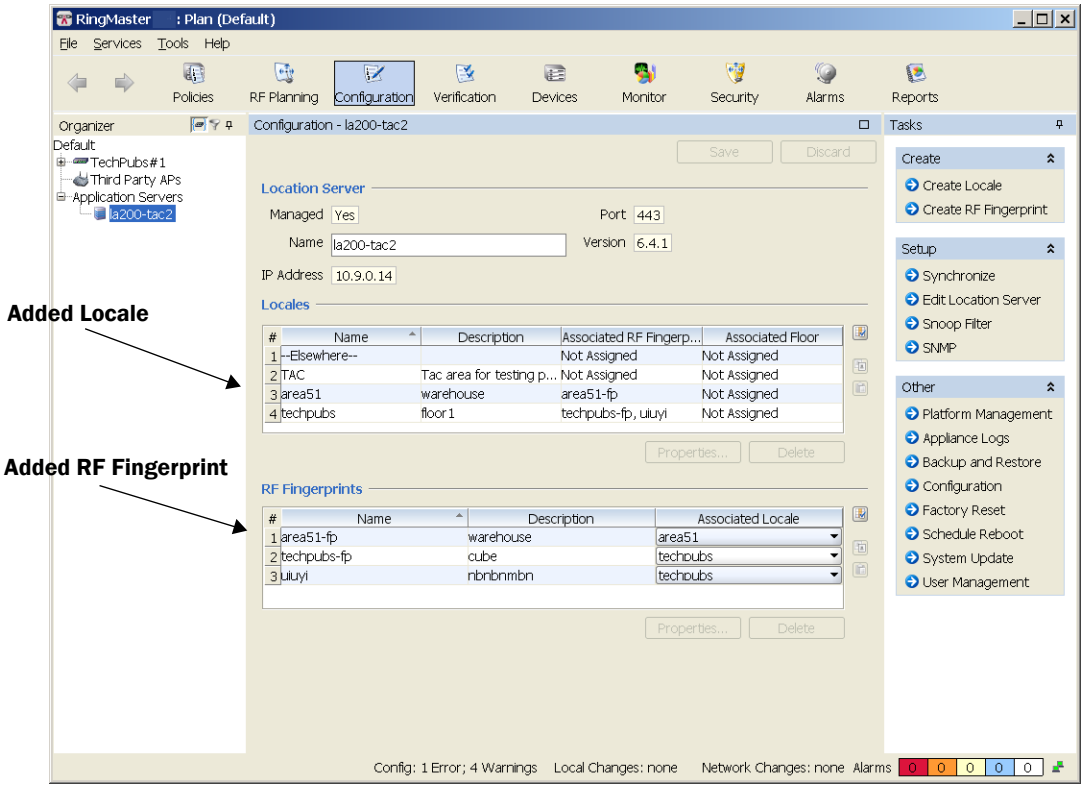
3. Enter the RF Fingerprint information including Name and Description. Click **Next**.



4. If there are other RF Fingerprints configured on the location appliance, they are displayed in the **Available RF Fingerprints** list. You can select one and add it to the **Current RF Fingerprints** list. You can also remove RF Fingerprints by selecting one from the **Current RF Fingerprints** list and clicking **Remove**.
5. Click **Finish** to complete the configuration. The new locale and RF Fingerprints appear in the Location Server and RF Fingerprints section. You can view the properties of a RF Fingerprints by selecting it and then clicking **Properties**.



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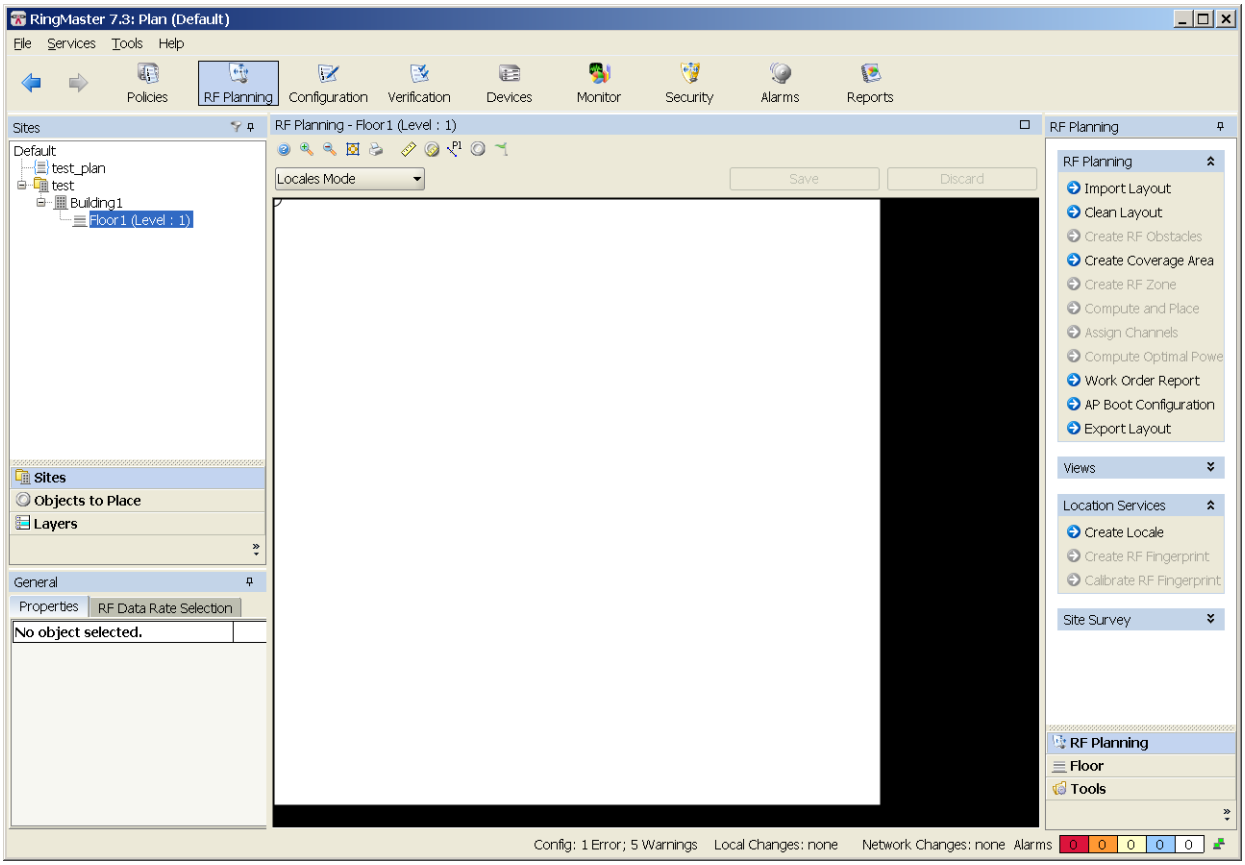
Creating Locales Using RF Planning

You can also create Locales using the RF Planning feature of RingMaster. Click **RF Planning** and select a plan from the **Organizer**. You can also import locales from CAD drawings.



Under **Location Services**, click **Create Locale**. The **Create Locale** wizard is displayed.

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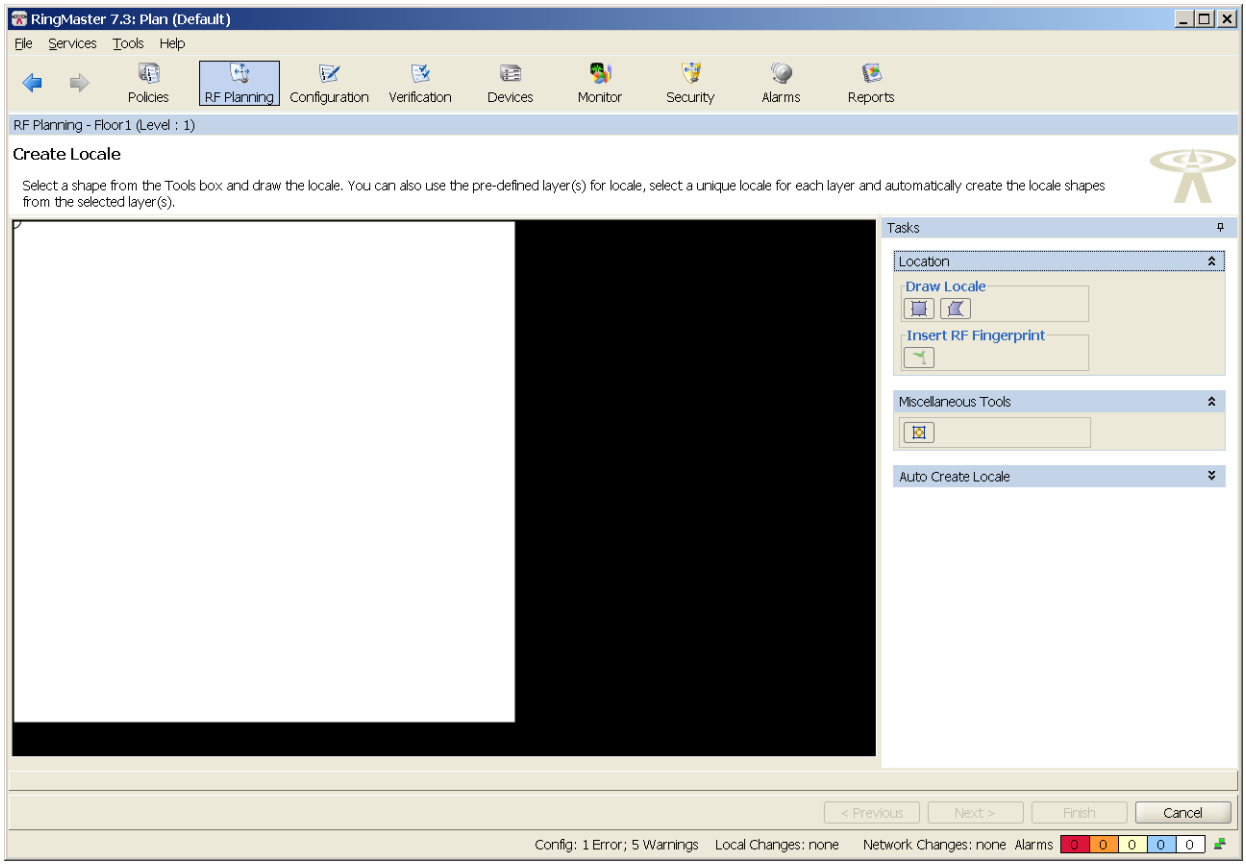
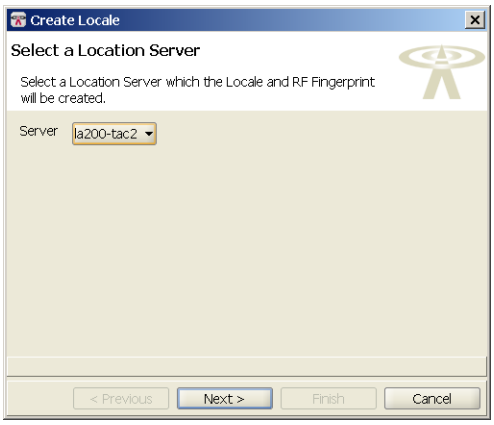


When you use the Drawing tools to draw the Locale, the **Create a Locale** wizard is displayed.



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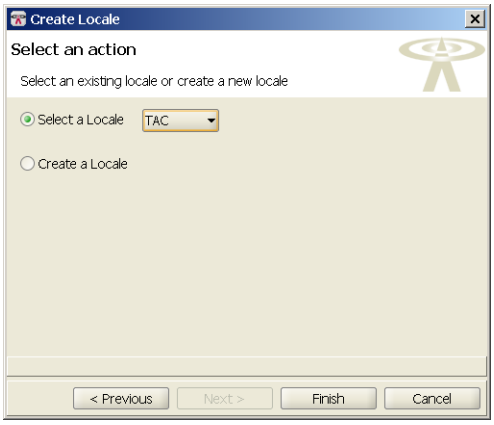
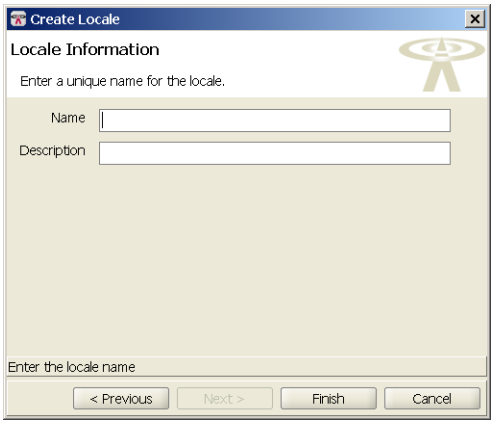
1. Select a Location Server from the list and click **Next**.



2. You can now select an existing locale or create a new locale. If you select an existing locale, click **Finish** to complete the configuration. If you select **Create a Locale**, click **Next**.



3. Type a name and description of the Locale in the **Name** and **Description** fields. Click **Finish** to complete the configuration.

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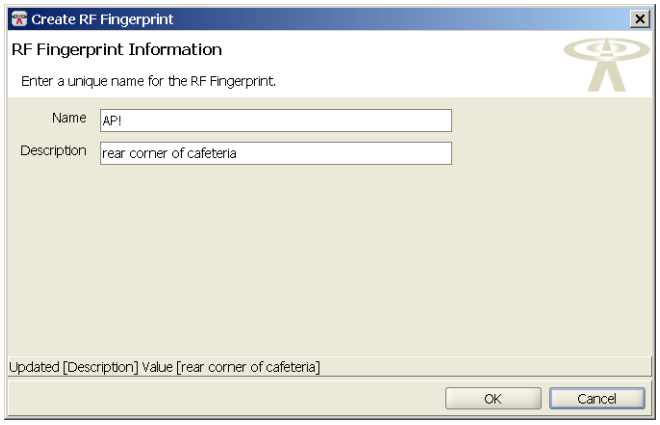
Adding RF Fingerprints Using RF Planning

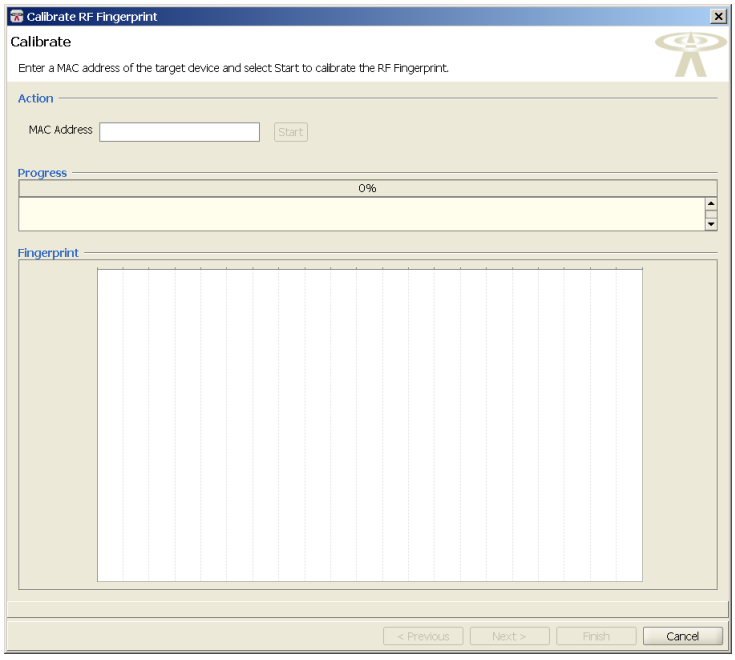
You can add RF Fingerprints to the Locale you just created by clicking **RF Fingerprint** in the **Task** list. When you move your cursor over the locale, it changes to a crosshair. Click and drag to display the RF Fingerprint wizard.



Enter a name and description for the RF Fingerprint and click **OK**. The RF Fingerprint now appears on the Locale.

Calibrating RF Fingerprints Using RF Planning

To calibrate an RF Fingerprint, click on the fingerprint icon in the locale to select it. Then click **Calibrate RF Fingerprint**.



Enter the MAC address of the device and click **Start**. You can see the status in the Progress bar. Once the process is complete, you can click **Next** to add it to the locale.

Creating RF Fingerprints

Select an LA-200E from the **Application Servers** list in the **Organizer** panel. The **Task** list is now populated with available tasks to perform on the location appliance. To create a RF Fingerprint, use the following steps:

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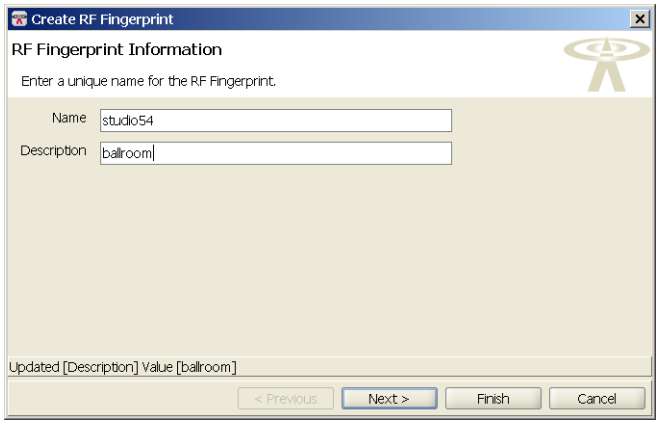
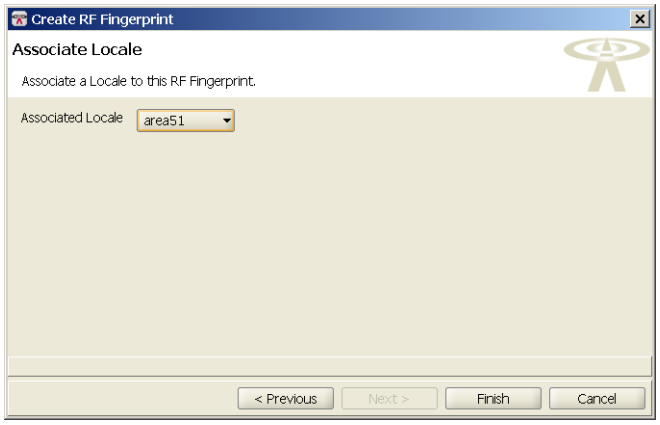
1. Under **Create**, click **Create RF Fingerprint**. The wizard is displayed.



2. Enter a name and description for the RF Fingerprint.
3. Click **Next**.



4. Select a locale from the **Associated Locale** list to associate with the RF Fingerprint.
5. Click **Finish** to complete the configuration.

The RF Fingerprint now appears in the **Locales** list and the **RF Fingerprints** list.

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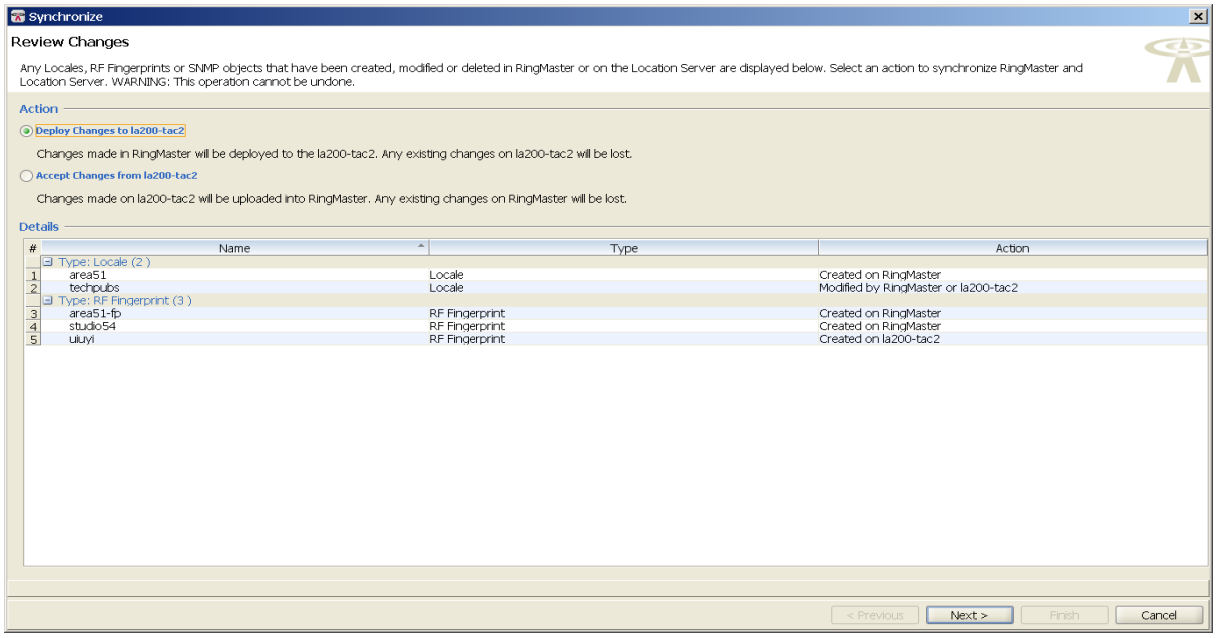
Setting Up a Location Appliance Using RingMaster

Select an LA-200E from the **Application Servers** list in the **Organizer** panel. The **Task** list is now populated with available tasks to perform on the location appliance.

Synchronizing Changes on a Location Appliance using RingMaster

To synchronize configurations on a location appliance, use the following steps:

1. In the **Task** list, click **Synchronize**.
2. The **Review Changes** panel is displayed.


Synchronize
Review Changes
Any Locales, RF Fingerprints or SNMP objects that have been created, modified or deleted in RingMaster or on the Location Server are displayed below. Select an action to synchronize RingMaster and Location Server. WARNING: This operation cannot be undone.
Action
Deploy Changes to la200-tac2
Changes made in RingMaster will be deployed to the la200-tac2. Any existing changes on la200-tac2 will be lost.
Accept Changes from la200-tac2
Changes made on la200-tac2 will be uploaded into RingMaster. Any existing changes on RingMaster will be lost.
Details
Name Type Action
Type: Locale (2)
1 area51 Locale Created on RingMaster
2 techpubs Locale Modified by RingMaster or la200-tac2
Type: RF Fingerprint (3)
3 area51-fp RF Fingerprint Created on RingMaster
4 studio54 RF Fingerprint Created on RingMaster
5 uiuyi RF Fingerprint Created on la200-tac2
< Previous
Next >
Finish
Cancel

3. You can select from two types of action:
   - Deploy Changes to the location appliance - changes made using RingMaster are applied to the location appliance.
   - Accept Changes from the location appliance - changes made on the location appliance are uploaded to RingMaster.

You cannot undo this operation. Once you click **Next**, the changes are synchronized between RingMaster and the LA-200.

4. Click **Next**. The changes are synchronized between RingMaster and the location appliance.
5. Click **Finish** to complete the operation.

The LA-200 image created using RingMaster is transferred to the LA-200 where it is used by other applications such as Active Asset. It is recommended that you create a backup of your current image before transferring the new on to the LA-200.

Editing Location Appliance Attributes Using RingMaster

To edit a location appliance, select it from the list of Application Servers. Then follow these steps:

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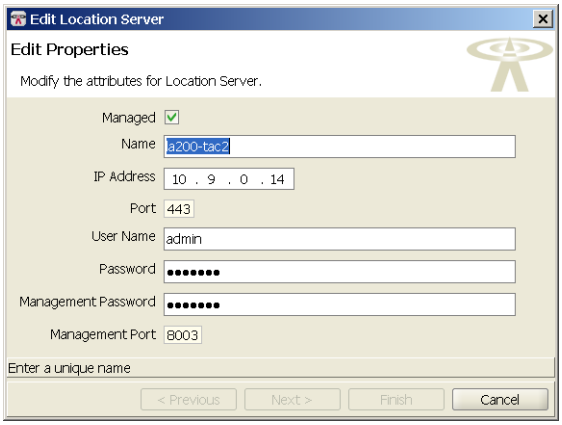
1. Click **Edit Location Server** to display the attributes for the server.

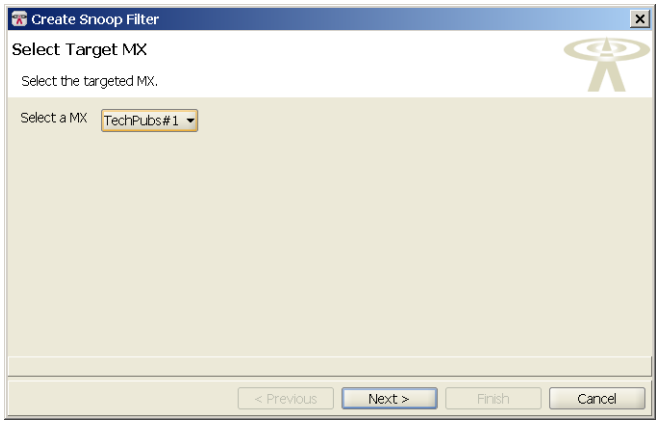


2. You can modify any of the listed attributes, and click **Next**.
3. RingMaster establishes a connection with the location appliance.
4. Click **Finish** to send the changes to the location appliance.

Configuring a Snoop Filter for a Location Appliance

You can configure a snoop filter on an MX using RingMaster and apply it to a location appliance. To configure a snoop filter, follow these steps:

1. In the **Task** list, under **Setup**, click **Snoop Filter**.



2. Select an MX to target from the **Select a MX** list.
3. Click **Next**.

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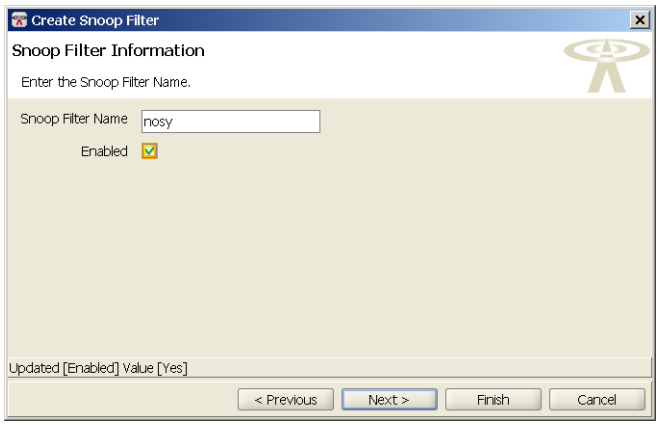
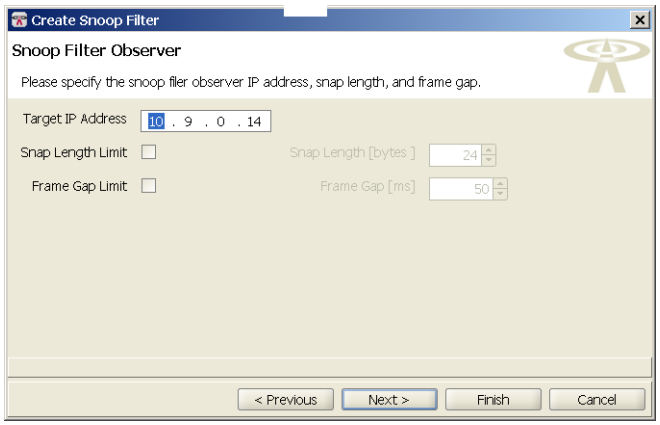
4. If there is an existing Snoop Filter on the MX, you can select it from the **Filters** list. If a Snoop Filter is not configured, you can select **Create a Filter**. Click **Next**.



5. In the **Snoop Filter Name** field, enter a name for the filter. Select **Enabled** to begin using the filter. Click **Next**.



6. Configure the **Snoop Filter Observer**. You must specify the following information:
   - Target IP Address
   - Snap Length Limit (optional)
   - Frame Gap Limit (optional)

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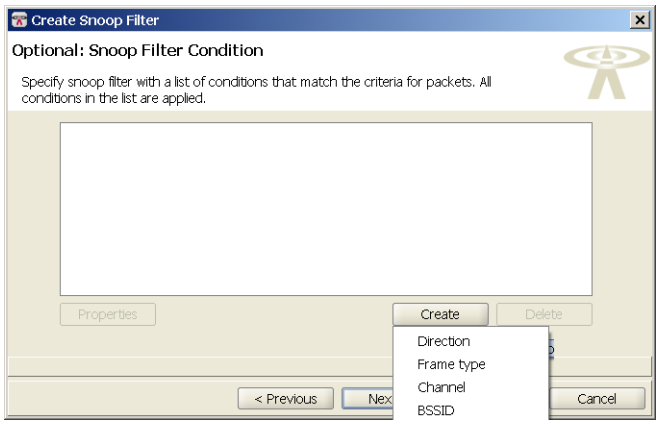
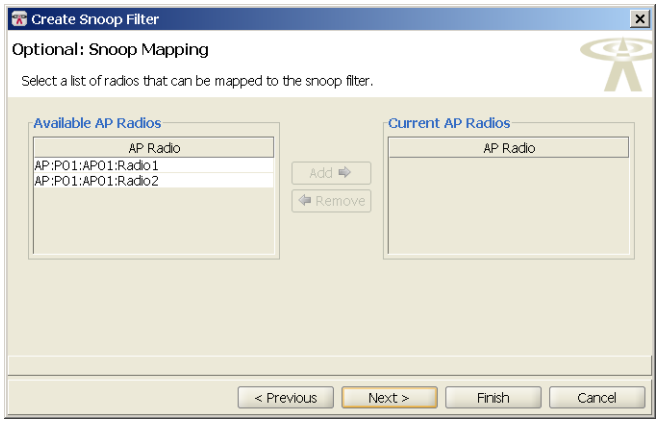
7. Click **Next**.



8. Optionally, you can create **Snoop Filter Conditions** by specifying a list of conditions that match the criteria for packets. The following conditions can be added to the Snoop Filter:
   - Direction
   - Frame Type
   - Channel
   - BSSID
   - Source MAC
   - Destination MAC
   - Host MAC
   - MAC Pair

   When you select a condition, a list of attributes is displayed that can be applied to it. Click **Next**



9. You can also configure optional **Snoop Mapping** by selecting radios on an MP to map the **Snoop Filter**. Click **Next**.
10. Additionally, you can map a Snoop Filter to a specific radio profile. Select one from the **Available Radio Profiles** list and click **Add** to move it into the **Current Radio Profiles** list.
11. Click **Finish** to complete the Snoop Filter configuration.

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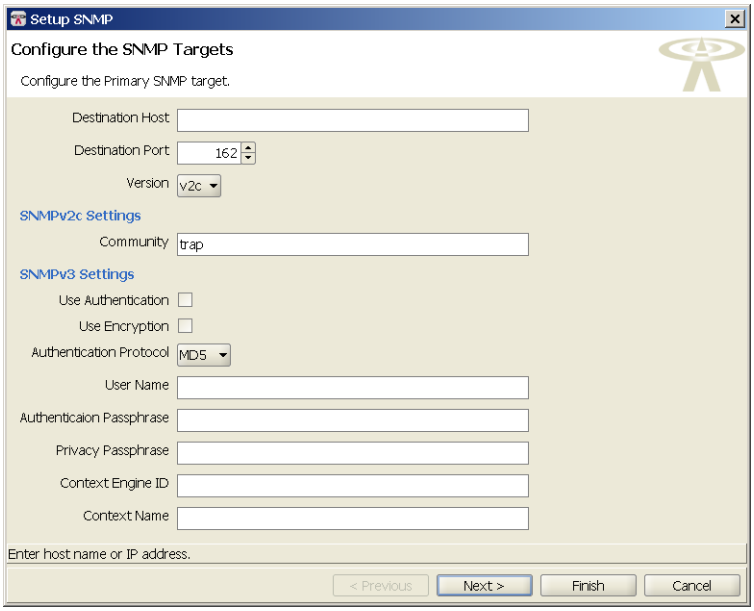
Configuring SNMP for a Location Appliance

You can configure SNMP settings for the Location Appliance using the RingMaster interface. Select a Location Appliance from the list in the **Organizer** panel and then click **SNMP**.



You need the following information to configure SNMP targets on the Location Appliance:

- **Destination Host**
- **Destination Port**
- **SNMP Version**

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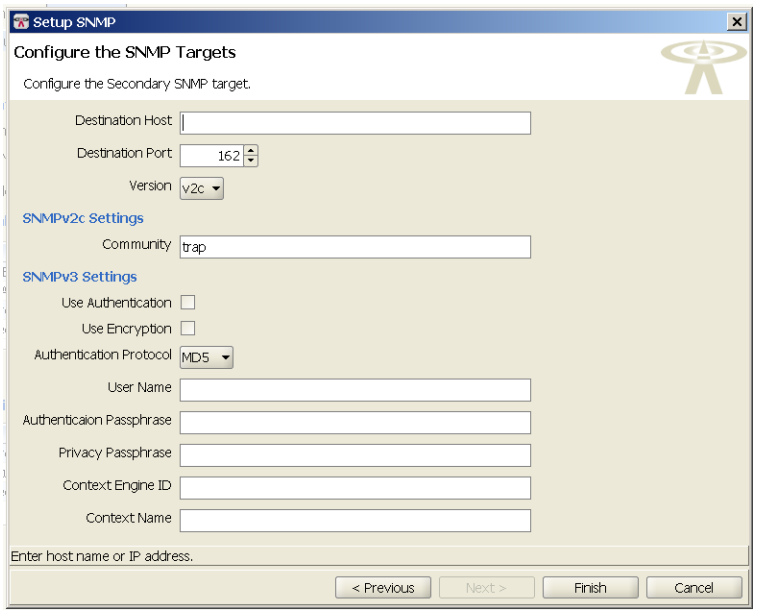
If you select SNMP Version v2c, then you configure the SNMPv2c Settings. If you select SNMPv3, then you configure the SNMPV3 settings. Click **Next** to continue with the configuration.



If you a secondary SNMP target, you can configure it by entering the appropriate information. Click **Finish** to complete the configuration.

All tasks listed under Other are performed on the LA-200E using the LA-200E user interface. Consult the *Trapeze LA-200 User's Guide* to perform any of these tasks.

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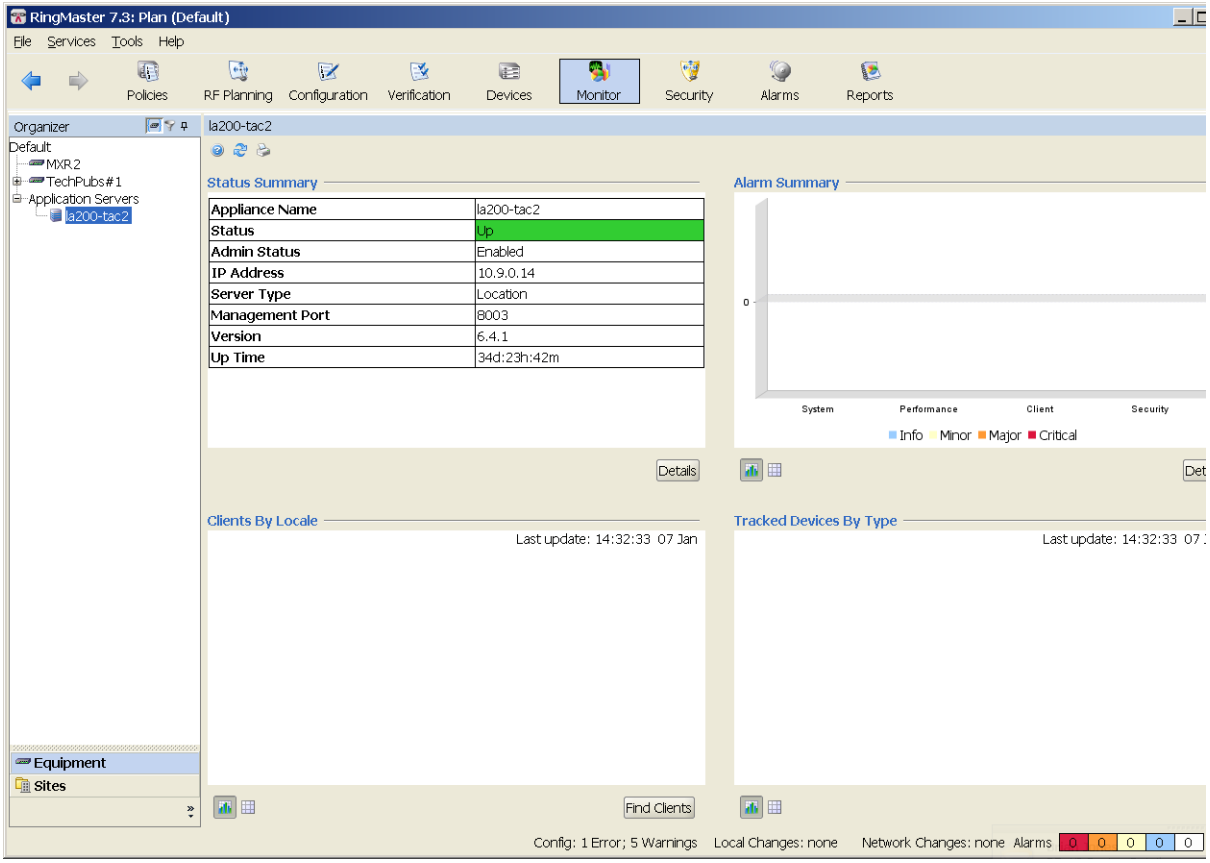
Monitoring the LA-200E

You can see the following status information on the LA-200E when you click Monitoring and then select the LA-200E from the Organizer panel.



The Monitor feature displays the following information:

- **Status Summary —** click **Details** for more information.
  - Appliance Name
  - Status
  - Admin Status
  - IP Address
  - Server Type
  - Management Port
  - Version
  - Up Time
- **Alarm Summary** — click **Details** for more information.

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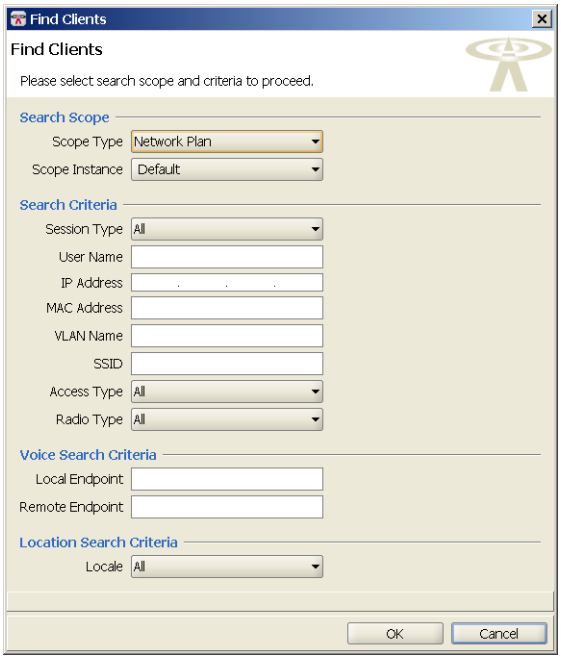
- **Clients by Locale** — you can also click **Find Clients** to search for clients on the network.



- **Tracked Devices by Type**

Additional LA-200E Areas Monitored by RingMaster

There are additional features on the LA-200E that can be monitored by RingMaster. When you select a floor with a LA-200E, a new Show Devices task is available. This task displays all the devices tracked by the LA-200E including:

- **Clients**
- **Tags**
- **APs**
- **Rogue APs**

You can filter the devices displayed using the following strings:

- **SSID**
- **User Name**
- **MAC Address**
- **IP Address**
- **End Address for SIP**
- **Radio Technology**

When you use the filtering capabilities, only the devices matching the filter are displayed. Once you clear the criteria, all devices are displayed again.

You can also hide or display the following items on the **Monitoring** interface:

- **Locales**
- **Fingerprints**
- **APs**
- **Clients (Voice and Data)**
- **Tags**
- **Rogue APs**
- **Client and AP Connections**

When you select **Show Devices** and then select an asset tag, you can see the temperature of the tag as well as the battery life for the tag.

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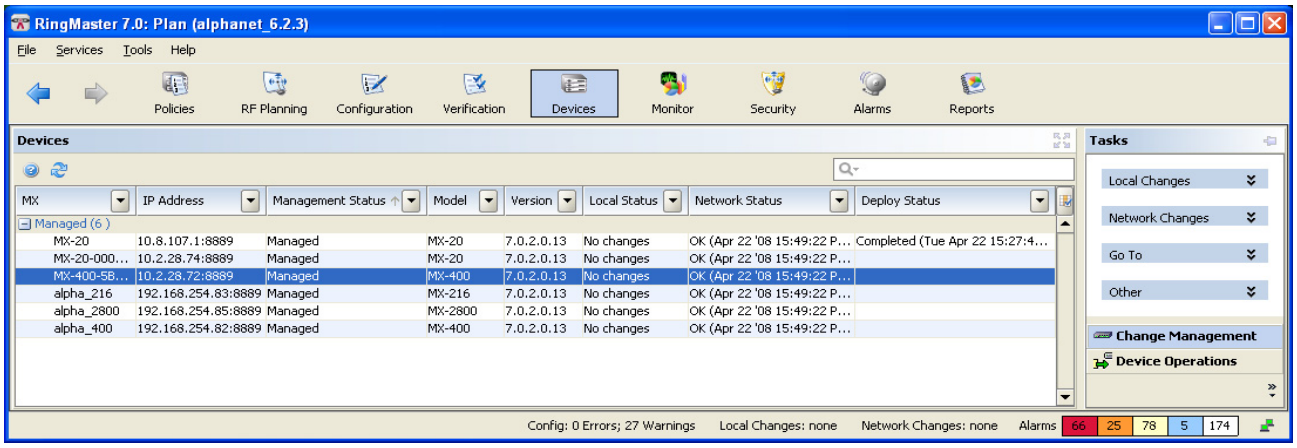
Managing Devices

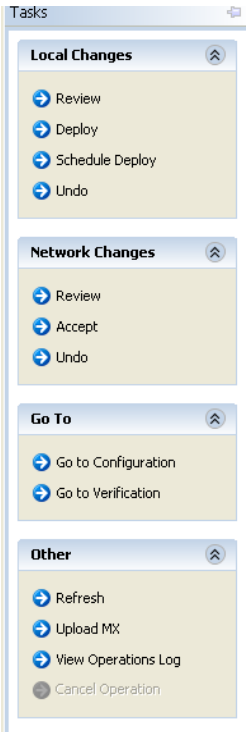
Clicking on the **Devices** button on the Navigation Bar brings up the following window containing the **Devices Dashboard**:



The **Tasks** panel contents change depending on whether the **Change Management** or the **Device Operations** tab near its bottom are selected. The next paragraphs describe the items shown in the **Tasks** panel for each.

Change Management Tab Items

This dashboard provides information on MXs in a network, and provides access to the following functions and or tasks:



- Local Changes
  - **Review**
  - **Deploy**
  - **Schedule Deploy**
  - **Undo**
- Network Changes
  - **Review**
  - **Accept**
  - **Undo**
- Go To
  - **Go to Configuration**
  - **Go to Verification**
- Other
  - **Refresh**
  - **Upload MX**
  - **View Operations Log**
  - **Cancel Operation**

Local Changes

Undo deletes all local changes from *RingMaster*. Deleted changes will not be deployed to an MX.

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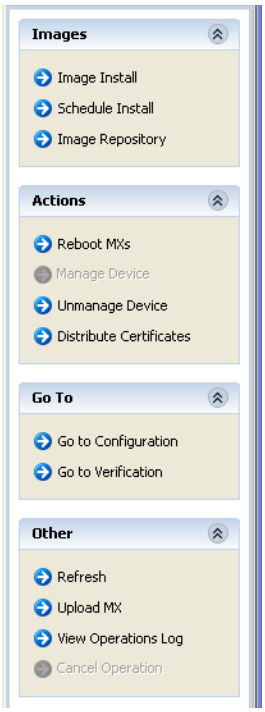
Network Changes

Network changes can be reviewed in the same manner as local changes. Click **Review** to examine items created, deleted, or modified on an MX via CLI, Webview or another instance of *RingMaster* appliance. Click **Accept** to store network changes in *RingMaster* and allow them to be managed. To cancel or undo network changes and revert an MX configuration to the stored *RingMaster* configuration, do this:

1. Click **Undo** network changes.
2. Click **Deploy** local changes.

All local changes made before clicking “Undo network changes” will be deployed at step 2.

Device Operations Tab Items



- ❍
- ❍Images
  - **Image Install**
  - **Schedule Install**
  - **Image Repository**
- ❍Actions
  - **Reboot MXs**
  - **Manage Device**
  - **Unmanage Device**
  - **Distribute Certificates**
- ❍Go To
  - **Go to Configuration**
  - **Go to Verification**
- ❍Other
  - **Refresh**
  - **Upload MX**
  - **View Operations Log**
  - **Cancel Operation**

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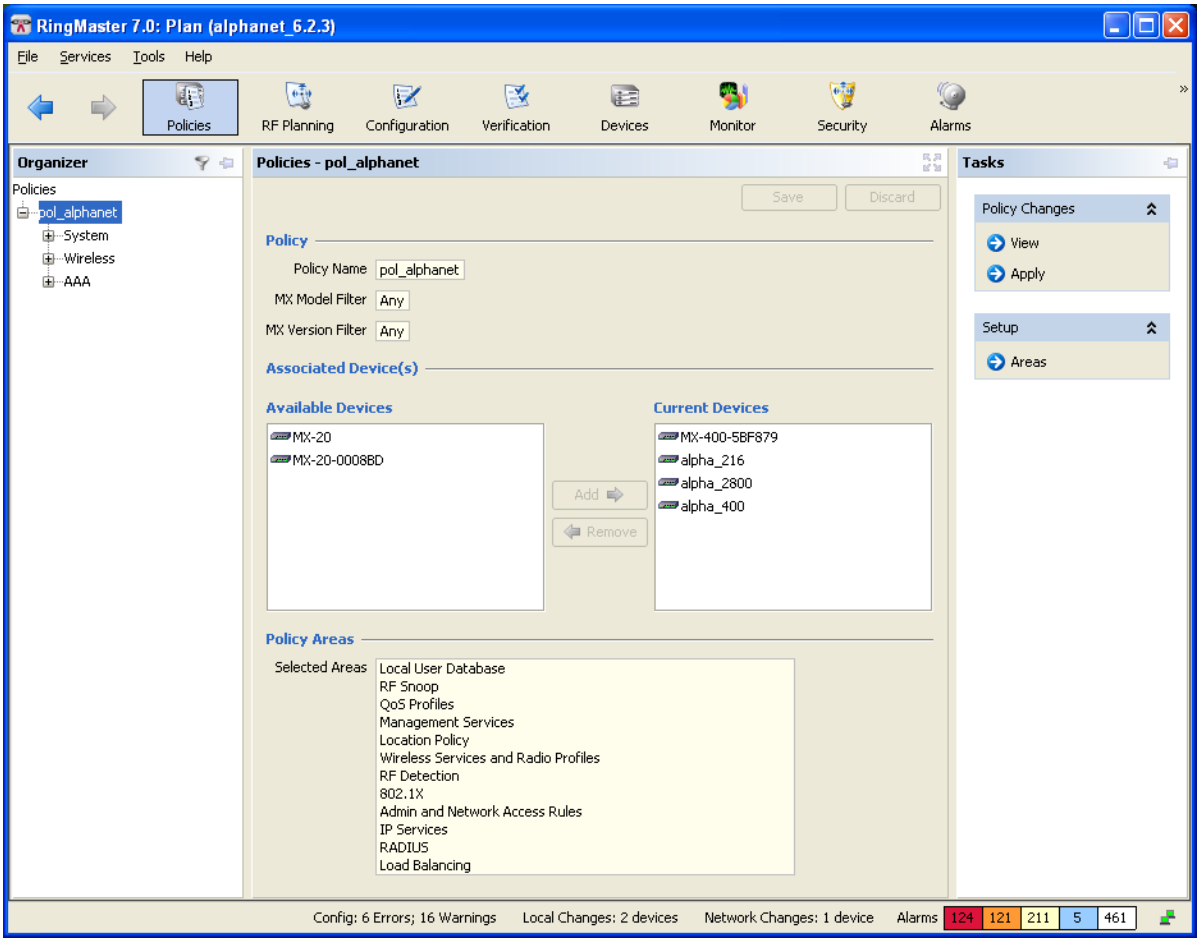
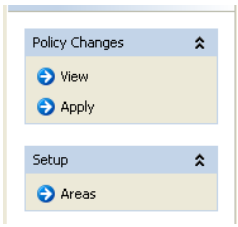
Managing Policies

Selecting the **Polcies** button on the Navigation Bar shows policies related to a selected item in the **Organizer** panel. The example below is for the policy pol_alphanet:



Policy Tab Items



- ❍
- ❍Policy Changes
  - ◆**View**
  - ◆**Apply**
- ❍Setup
  - ◆**Areas**

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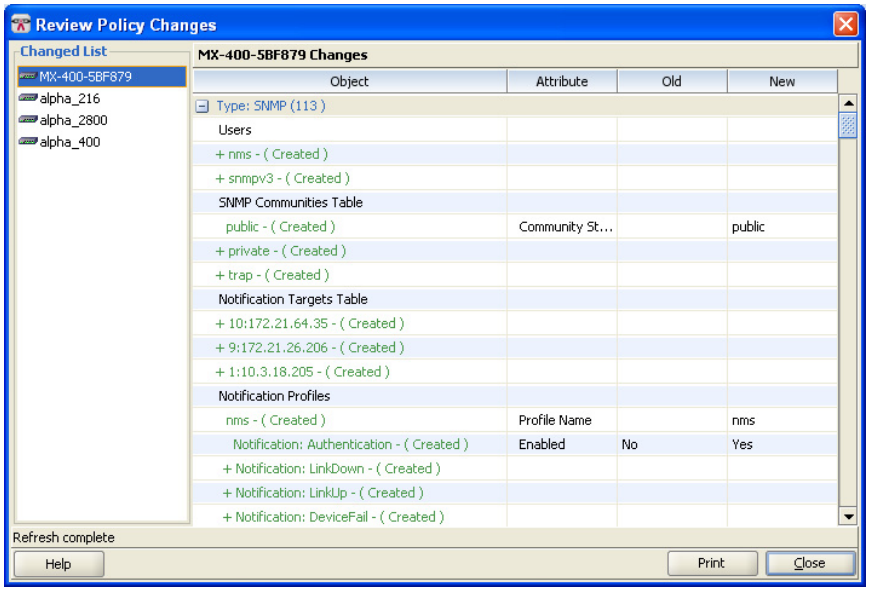
Viewing Policy Changes

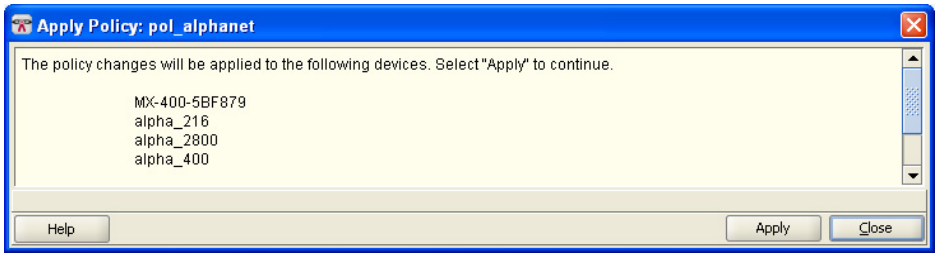
After selecting the **Policies** tab, selecting **View** in the **Tasks** panel allows you to view policy changes. Selecting an item in the **Changed List** of the dialog that appears shows policy changes related to that item.



Click **Print** for a copy and **Close** when done.

Applying Policy Changes

After selecting the **Policies** tab, selecting **Apply** in the **Tasks** panel allows you to apply policy changes. Selecting an item in the **Changed List** of the dialog that appears shows policy changes related to that item. You see a dialog like that below:



Click **Apply** to apply changes and **Close** when done.

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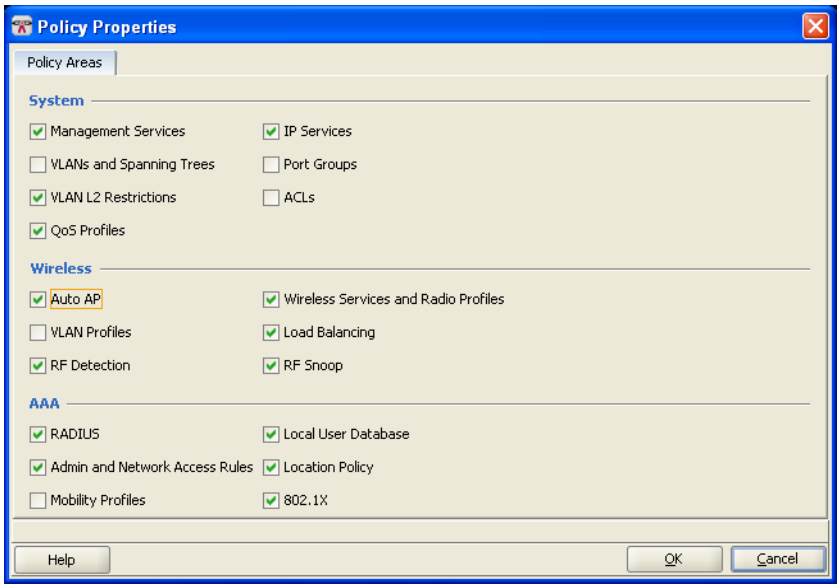
Selecting Policy Areas

After selecting the **Policies** tab, selecting **Areas** in the **Tasks** panel allows you to select policy areas. You see a dialog like that below:



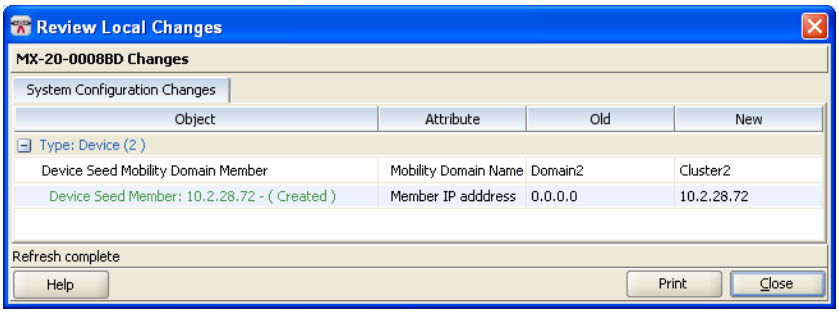
Click **OK** after making selections or **Cancel** when done.

Configuration Management

Any changes you make to a network in *RingMaster* are saved in a network plan on the server, but changes are not applied to the network until they are deployed. You see changes in *RingMaster*, but these changes are only present in a network plan until you deploy them to the MXs in a network. You can apply a configuration to multiple MXs, or deploy changes to a single MX. *RingMaster* allows you to deploy changes immediately, or to schedule deployment.

Reviewing Local Changes

Select device(s) with local changes and click **Review**. You see a dialog like that below:



Examine changes that will be made to an MX. The **Review** window is a table with expandable rows to drill down to individual attributes. Created items are green, deleted items are orange, and modified items are black. Click **Print** for a copy and **Close** when done.

Local changes cannot be deployed when network changes are detected. You must first accept or undo network changes.

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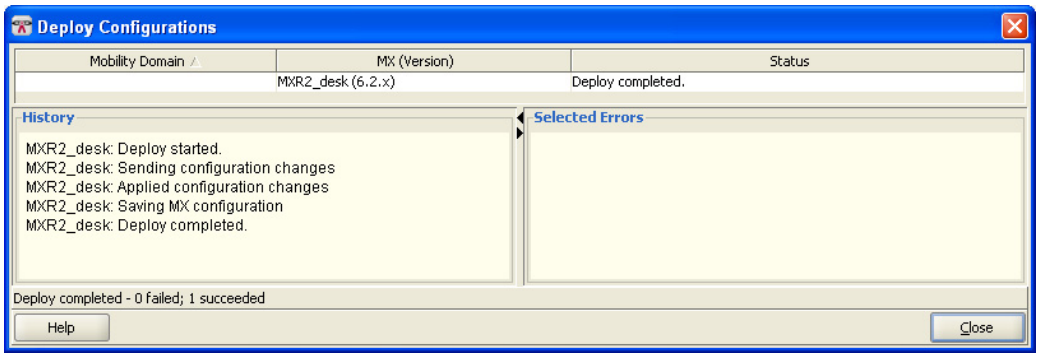
Deploying Local Changes

To deploy local changes immediately:

1. Select the **Devices** Navigation Bar button.
2. At the bottom of the **Tasks** panel, select **Change Management**.
3. Select one or more managed MXs. To select multiple MXs, press **Shift** (for contiguous MXs) or **Control** (for non-contiguous MXs) while clicking. Multiple selection enables tasks applicable to all selected devices, including reviewing local changes.
4. In the **Local Changes** group in the **Tasks** panel, click **Deploy**. The **Deploy Configurations** dialog box appears. This dialog lists MX **Mobility Domain**, **Version**, **Status**, **History** and **Selected Errors**.

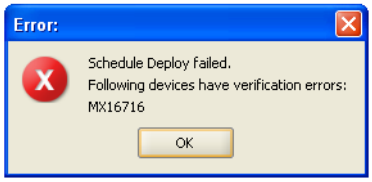


Click **Close**.

Scheduling Deployment

To schedule local change deployment:

1. Select the **Devices** Navigation Bar button.
2. At the bottom of the **Tasks** panel **Local changes** group, select **Schedule Deploy**.
3. Select one or more MXs. To select multiple MXs, press **Shift** (for contiguous MXs) or **Control** (for non-contiguous MXs) while clicking.
4. In the **Tasks** panel in the **Local Changes** group, click **Schedule Deploy**.
   If there are errors preventing deployment, you see the following dialog:



When errors are cleared, this deployment must be repeated.

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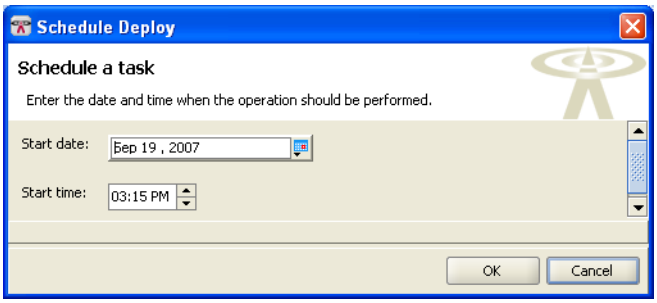
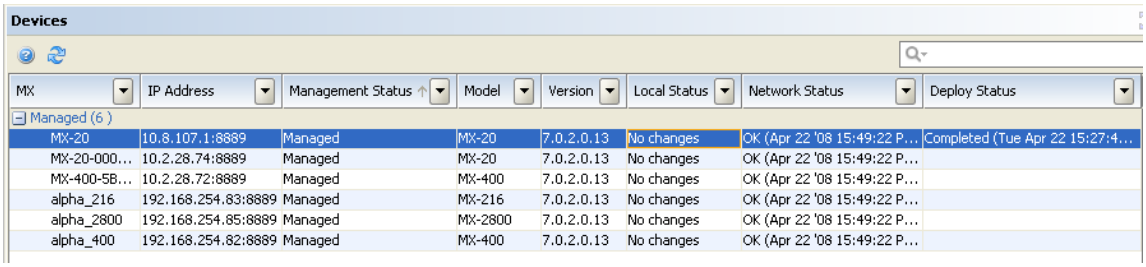
5. The **Schedule Deploy** dialog box appears.



6. Edit the **Start date** and **Start time**. (Date and time are based on the date and time on the machine where *RingMaster Services* are installed.)
   Click **OK**.

Verifying Deployment

1. Leave the **Devices** Navigation Bar button selected.


Devices
MX
IP Address
Management Status
Model
Version
Local Status
Network Status
Deploy Status
Managed (6)
MX-20 10.8.107.1:8889 Managed MX-20 7.0.2.0.13 No changes OK (Apr 22 '08 15:49:22 P... Completed (Tue Apr 22 15:27:4...
MX-20-000... 10.2.28.74:8889 Managed MX-20 7.0.2.0.13 No changes OK (Apr 22 '08 15:49:22 P...
MX-400-5B... 10.2.28.72:8889 Managed MX-400 7.0.2.0.13 No changes OK (Apr 22 '08 15:49:22 P...
alpha_216 192.168.254.83:8889 Managed MX-216 7.0.2.0.13 No changes OK (Apr 22 '08 15:49:22 P...
alpha_2800 192.168.254.85:8889 Managed MX-2800 7.0.2.0.13 No changes OK (Apr 22 '08 15:49:22 P...
alpha_400 192.168.254.82:8889 Managed MX-400 7.0.2.0.13 No changes OK (Apr 22 '08 15:49:22 P...

2. Look in the **Deploy Status** column for the switch(es) to which you deployed configuration information. Their status should be **Completed (Date)**. You also can verify successful deployment by checking the operation log.

When a local change or image deploy hangs and is incomplete, an MX is locked by *RingMaster* and cannot be modified. This is a special server-side lock that cannot be removed via the **Lock Management** *RingMaster* server Web page. You must remove this lock by selecting an MX row and clicking **Cancel operation**.

Accessing the Log

1. Select the **Devices** Navigation Bar button.
2. At the bottom of the **Tasks** panel, select **Device Operations**.

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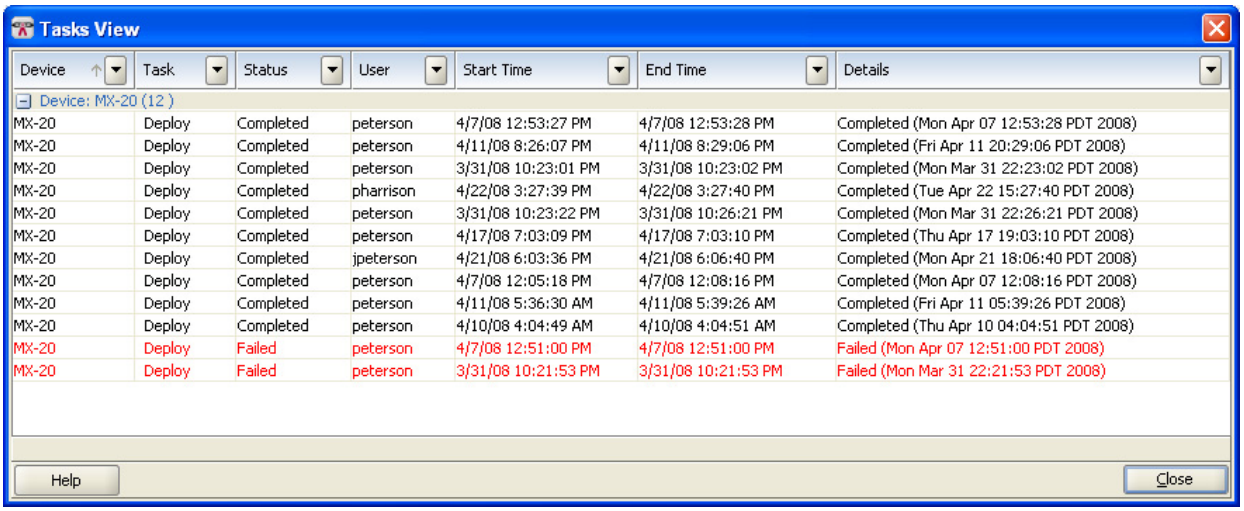
3. In the **Tasks** panel, select **View Operations Log**.


Tasks View
Device
Task
Status
User
Start Time
End Time
Details
Device: MX-20 (12)
MX-20 Deploy Completed peterson 4/7/08 12:53:27 PM 4/7/08 12:53:28 PM Completed (Mon Apr 07 12:53:28 PDT 2008)
MX-20 Deploy Completed peterson 4/11/08 8:26:07 PM 4/11/08 8:29:06 PM Completed (Fri Apr 11 20:29:06 PDT 2008)
MX-20 Deploy Completed peterson 3/31/08 10:23:01 PM 3/31/08 10:23:02 PM Completed (Mon Mar 31 22:23:02 PDT 2008)
MX-20 Deploy Completed pharrison 4/22/08 3:27:39 PM 4/22/08 3:27:40 PM Completed (Tue Apr 22 15:27:40 PDT 2008)
MX-20 Deploy Completed peterson 3/31/08 10:23:22 PM 3/31/08 10:26:21 PM Completed (Mon Mar 31 22:26:21 PDT 2008)
MX-20 Deploy Completed peterson 4/17/08 7:03:09 PM 4/17/08 7:03:10 PM Completed (Thu Apr 17 19:03:10 PDT 2008)
MX-20 Deploy Completed jpeterson 4/21/08 6:03:36 PM 4/21/08 6:06:40 PM Completed (Mon Apr 21 18:06:40 PDT 2008)
MX-20 Deploy Completed peterson 4/7/08 12:05:18 PM 4/7/08 12:08:16 PM Completed (Mon Apr 07 12:08:16 PDT 2008)
MX-20 Deploy Completed peterson 4/11/08 5:36:30 AM 4/11/08 5:39:26 AM Completed (Fri Apr 11 05:39:26 PDT 2008)
MX-20 Deploy Completed peterson 4/10/08 4:04:49 AM 4/10/08 4:04:51 AM Completed (Thu Apr 10 04:04:51 PDT 2008)
MX-20 Deploy Failed peterson 4/7/08 12:51:00 PM 4/7/08 12:51:00 PM Failed (Mon Apr 07 12:51:00 PDT 2008)
MX-20 Deploy Failed peterson 3/31/08 10:21:53 PM 3/31/08 10:21:53 PM Failed (Mon Mar 31 22:21:53 PDT 2008)
Help
Close

Performing Basic Administrative Tasks

This section contains information about basic administrative tasks you perform in *RingMaster*. For detailed information about administrative tasks, such as configuring MX management services, refer to the “Configuring MX System Parameters” chapter in the publication *RingMaster 7.0 Configuration Guide*. For more information about image and file management, see the chapter “Managing MX System Images and Configurations” in the *Trapeze Mobility System Software Command Reference.*

Configuring MX Management Services

You configure the following information and management services for an MX:

- **System information** — You can specify system contact information, as well as CLI prompt and the banner message that appears in each session.
- **HTTPS** — By default, HTTPS is enabled. TCP port 443 is used for secure access by *Web View*, the Trapeze Web-based application for managing an MX.

RingMaster communications also use HTTPS, but *RingMaster* is not affected by the HTTPS configuration on an MX. For *RingMaster*, HTTPS is always enabled and listens to port 8889.

- **Telnet** — By default, Telnet is disabled. You can enable Telnet for unencrypted access to the CLI.
- **SSH** — By default, SSH is enabled. You can use SSH for encrypted access to the CLI.
- **SNMP** — By default, SNMP is disabled. You can configure SNMP community strings and User Security Model (USM) users, notification profiles, and notification targets.
- **Logging** — The system log provides event information for monitoring and troubleshooting. You can send the log information to a local data buffer on an MX, to the console, to a Telnet session, and to a configured set of syslog servers.
- **Tracing** — Tracing allows you to review diagnostic information for debugging MSS. Tracing allows you to review messages about the status of a specific area of MSS.
- **Time zone** and summertime settings — You can statically configure system time and date. You can configure MSS to offset the time by an additional hour for daylight savings time or similar summertime period.

To manage services on an MX:

1. Select the **Configuration** Navigation Bar button.
2. In the **Organizer** panel, click the plus sign next to the MX.

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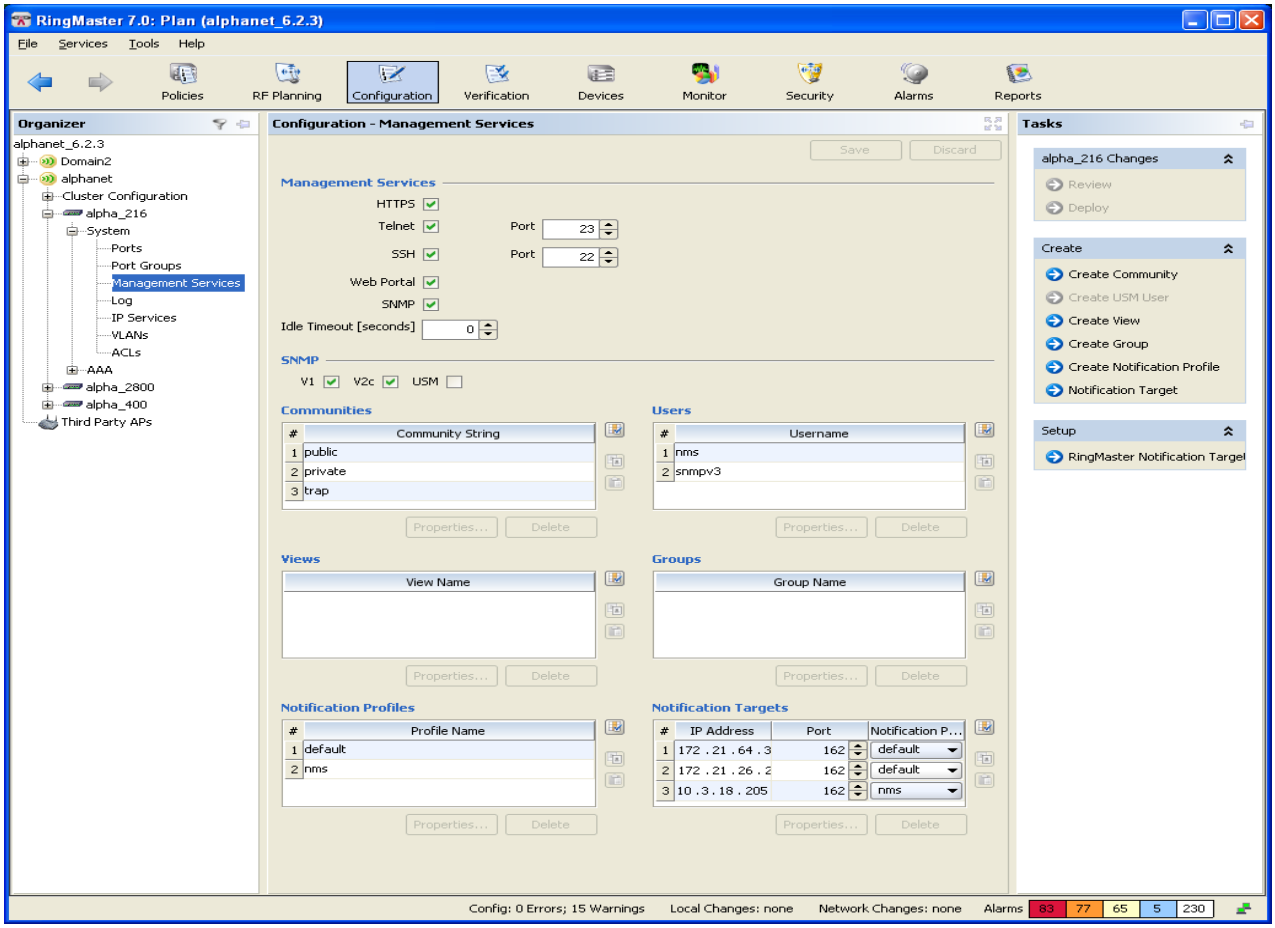
3. Click the plus sign next to **System**.
4. Select **Management Services**. Management services/settings appear in the **Content** panel.



5. Use the **Content** panel and **Tasks** options to modify settings. (For information about management options, refer to the “Configuring MX System Parameters” chapter in the publication *RingMaster 7.0 Configuration Guide*.)

Distributing System Images

You can use *RingMaster* to upgrade or downgrade a system image (MSS software) on MXs. System images include switch software and AP software.

Using the Image Repository

Use the image repository to add or delete MX system images. An image file is checked and its version verified when it is added to the image repository. Images are stored in the **RingMaster_installation_directory\images\dp** directory.

To add a system image:

1. Select the **Devices** Navigation Bar button.
2. At the bottom of the **Tasks** panel, select **Device Operations**.

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3. From the **Tasks**, select **Image Repository**.

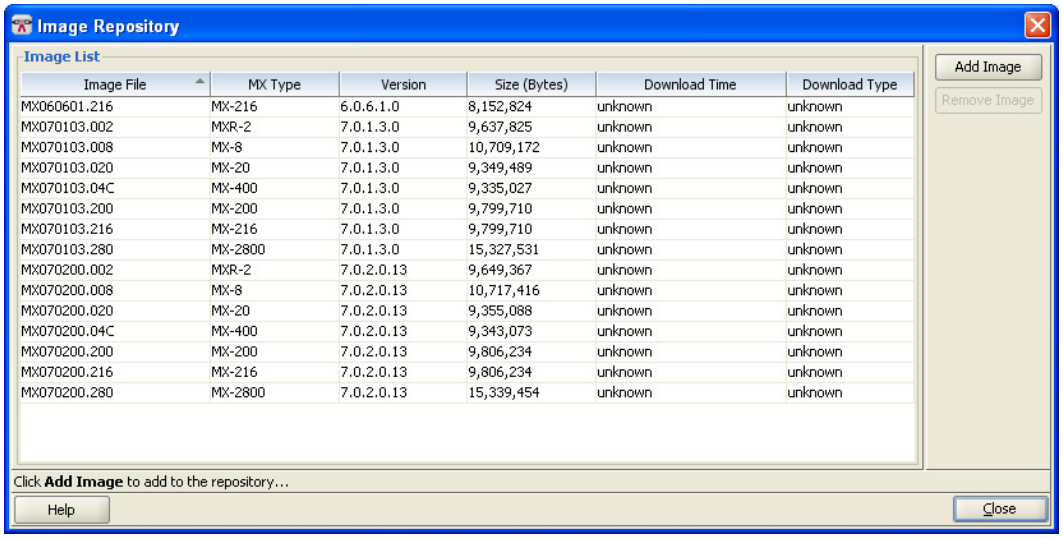
Image Repository
Image List
Image File
MX Type
Version
Size (Bytes)
Download Time
Download Type
MX060601.216 MX-216 6.0.6.1.0 8,152,824 unknown unknown
MX070103.002 MXR-2 7.0.1.3.0 9,637,825 unknown unknown
MX070103.008 MX-8 7.0.1.3.0 10,709,172 unknown unknown
MX070103.020 MX-20 7.0.1.3.0 9,349,489 unknown unknown
MX070103.04C MX-400 7.0.1.3.0 9,335,027 unknown unknown
MX070103.200 MX-200 7.0.1.3.0 9,799,710 unknown unknown
MX070103.216 MX-216 7.0.1.3.0 9,799,710 unknown unknown
MX070103.280 MX-2800 7.0.1.3.0 15,327,531 unknown unknown
MX070200.002 MXR-2 7.0.2.0.13 9,649,367 unknown unknown
MX070200.008 MX-8 7.0.2.0.13 10,717,416 unknown unknown
MX070200.020 MX-20 7.0.2.0.13 9,355,088 unknown unknown
MX070200.04C MX-400 7.0.2.0.13 9,343,073 unknown unknown
MX070200.200 MX-200 7.0.2.0.13 9,806,234 unknown unknown
MX070200.216 MX-216 7.0.2.0.13 9,806,234 unknown unknown
MX070200.280 MX-2800 7.0.2.0.13 15,339,454 unknown unknown
Add Image
Remove Image
Click Add Image to add to the repository...
Help
Close

4. Click **Add Image**. The **Add to Repository** dialog box appears.
5. Navigate to the directory containing the system image.
6. Select the system image.
7. Click **Add to Repository**. The image is added to the image repository and appears in the Image List.
8. To close the **Image Repository** dialog box, click **Close**.

To delete a System Image:

1. In the **Image Repository** dialog box, select an image to delete.
2. Click **Remove Image**. A prompt appears.
3. Click **Yes** to delete the system image.
4. To close the **Image Repository** dialog box, click **Close**.

You can distribute a system image to one or more MXs in a network plan. To use a new system image, you must reboot an MX.

Trapeze Networks recommends that you use the **Verification** button to resolve any configuration errors or warnings before you distribute system images. See “Verifying Configuration Changes” in the publication *RingMaster Configuration Guide*.

Before you can distribute an image, you must add it to the image repository. (See **Using the Image Repository**.)

To immediately install an image on MXs:

1. Select **Devices**.
2. From the **Tasks**, select **Device Operations**.
3. From the **Managed Devices** list, select MXs to install the image. To select more than one MX, click **Shift** while clicking to select contiguous items, or click **Ctrl** (Macintosh: **Command**) while clicking to select noncontiguous items.

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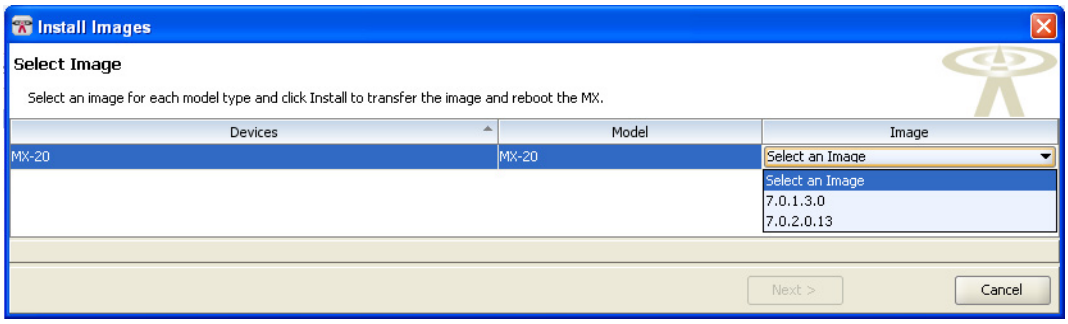
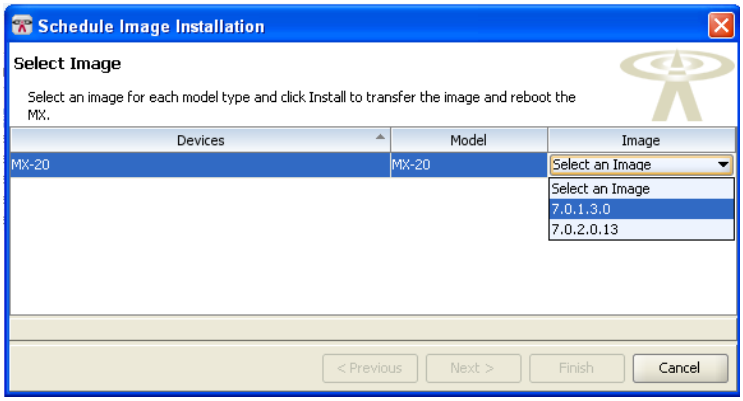
4. In the **Tasks** panel, select **Image Install**.



5. Click **Select** an Image to display the list of images in the repository.
6. Select the image and click **Install**.

To schedule installation of an image on MXs:

1. Select the **Devices** Navigation Bar button.
2. At the bottom of the **Tasks** panel, select **Device Operations**.
3. In the **Managed Devices** list, select the MXs to install an image. To select more than one MX, click **Shift** while clicking to select contiguous items, or click **Ctrl** (Macintosh: **Command**) while clicking to select noncontiguous items.
4. In the **Tasks** panel, select **Schedule Install**.



5. Click **Select** an Image to display the list of images in a repository. Click **Next**.
6. Edit the start date and time. (The date and time are based on the date and time on the computer with the *RingMaster Services* installation.) Click **Finish**.

Saving Versions of Network Plans

You can save multiple versions of a network plan in *RingMaster*. After deploying a network plan to an MX, you can save a snapshot of the plan as a version. You should create versions of a network plan on a regular basis, and at major baseline events, for network configurations. This stores snapshots of network configurations in case you need to revert to one of them. If you need to roll back configuration changes, you use a saved version to roll back the software image and configuration files to a known state. Before you save a version of a network plan, you must deploy and save the network plan.

Versions of network plans are saved in the **db/xml/versions** directory in the *RingMaster* installation directory. After saving a version of a network plan, a version appears in the list of available network plans. If you open a version of a network plan, you can deploy it or open it. When a version is open, its version name is displayed in the title bar of the *RingMaster* window.

To save a version of a network plan:

1. Select **Services > Plan Management**. The **Plan Management** page is displayed in your default browser.

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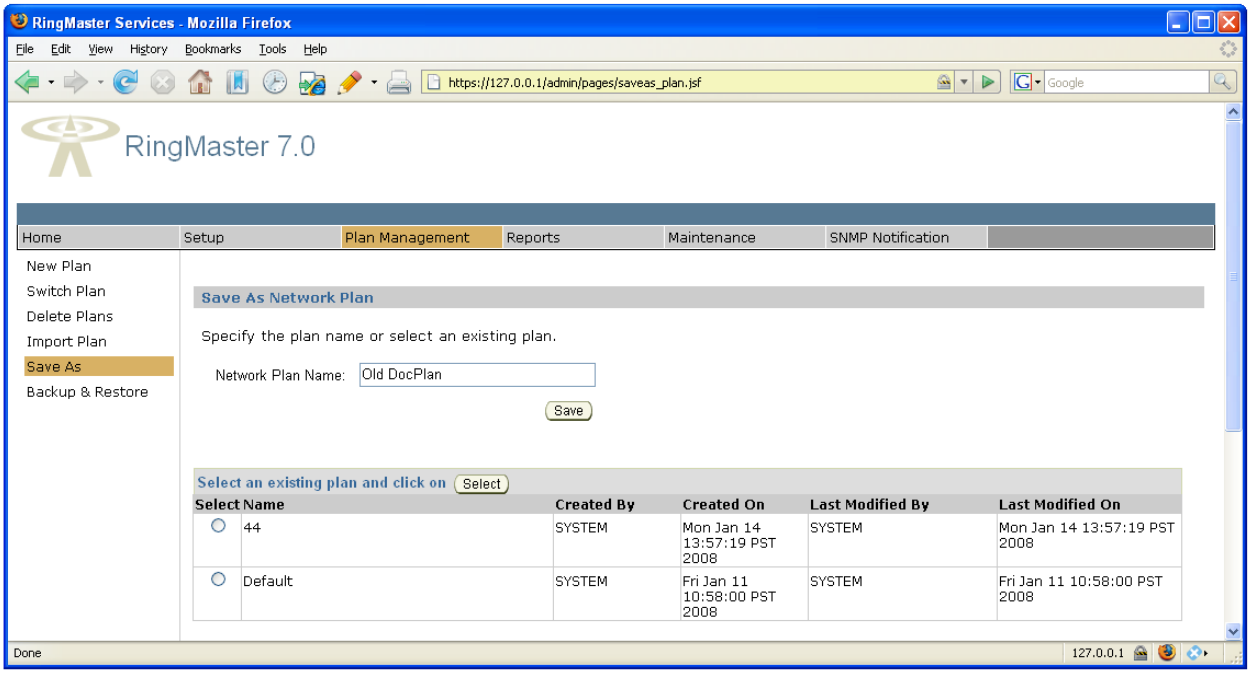
2. In the left-hand column of the page, click **Save As**. The **Save As Network Plan** window is displayed.



3. In the **Network Plan Name** field, type a name for the plan.
4. Click **Save**.

Saving Network Plans Automatically

By default, *RingMaster* uses the autosave feature to automatically save changes to a network plan at regular intervals. To view or modify backup settings, select **Services > Backup & Restore** to display **Backup & Restore** in a browser window.

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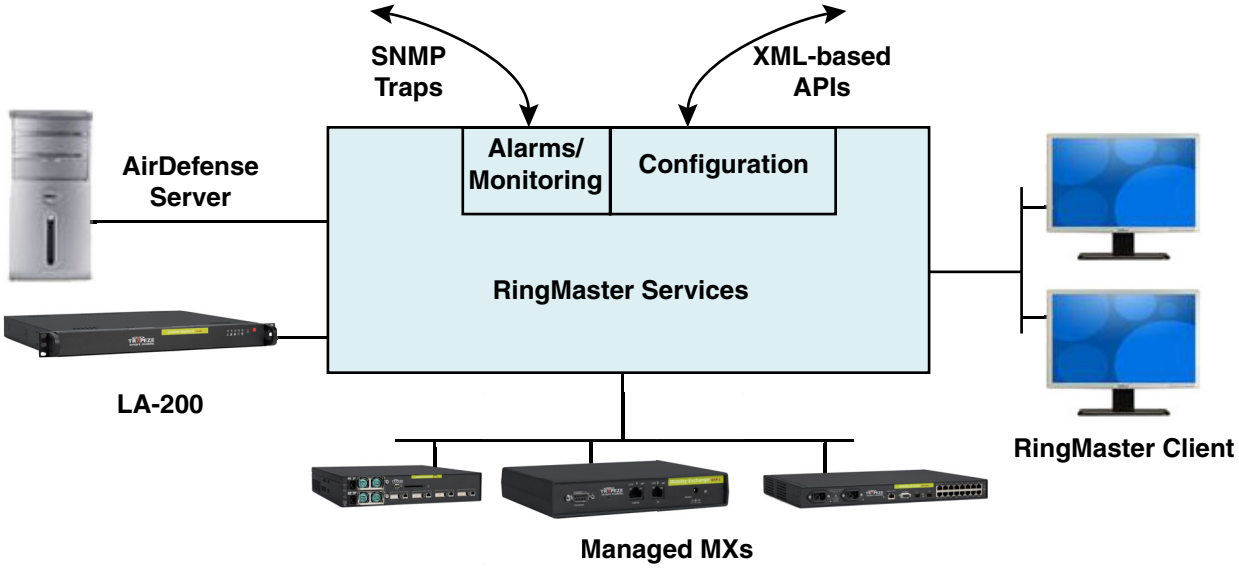
RingMaster SNMP Agent



The *RingMaster SNMP Agent* provides access to allow upstream application programs to perform WLAN management tasks without GUI interaction. An upstream application can retrieve the configuration of MPs in a *RingMaster* managed network domain. This software can, for example, get information on a set of MPs by serial number or MP type. After an upstream application binds to utilize the *RingMaster SNMP Agent*, that application can initiate transactions using this interface.

The capabilities enabled by *RingMaster SNMP Agent* include:

- **Client/session information**
- **Alarms**
- **Monitoring**
- **Security (rogues, neighbor lists, etc.)**
- **Policies**
- **Reports**
- **RF Planning**
- **Software Generics Management**

Transactions enacted between upstream application(s) and the *RingMaster SNMP Agent* are often scoped with regards to applicable managed entities. This limits the amount of time an upstream application needs to process resulting information flows. *RingMaster SNMP Agent's* interface meets recommendations of standards authorities such as the World Wide Web Consortium (W3C). See the figure above for a high-level view of interfaces. The *RingMaster SNMP Agent* software's goal is to provide programmable access to upstream applications so they can accomplish required WLAN management tasks without GUI interaction. There are two interfaces that will be available as described in the next paragraphs.

This interface allows use of an XML API to query configuration and monitoring data. It uses REST based web services for easy integration. It uses standard Internet protocols including XML over HTTPS,

Web Services API

The *Web Services API* is used to set up the SNMP interface and provide other alarm / inventory details using polling rather than using a trap mechanism.

- The Agent version is the REST interface version which is not the same as the *RingMaster* software version. This is defined for upgrades and future use.
- The Web API provides an alarm summary from the *RingMaster* alarm module (each alarm type, criticality and their counts). The alarm summary can be filtered based on query criteria using the Web API. (For example, client failure alarms with a certain SSID).

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- The Web API provides inventory information, such as a list of devices (MXs and APs) and their information in *RingMaster* (name, model, serial number, build number, system IP, location, contact info, admin state, and operational status).

For configuration of this API, refer to the publication *RingMaster Web Services API*.

SNMP Traps

SNMP traps provide a standards-based mechanism for encoding and delivery of *RingMaster* alarms and retrieval of status and configuration information.

The *RingMaster Agent* supports new components including the RM-200 Appliance.

The SNMP Trap interface is designed to provide an asynchronous mechanism for encoding and delivering *RingMaster* alarms and monitoring information.

Areas of integration are:

- **Fault Management** — Monitors of enterprise network infrastructure, such as HP *OpenView*
- **Security** — WLAN intrusion detection and prevention systems (IDS/IPS), example, Enterasys *Dragon*.

Network alarm notifications are made by:

- Correlation of SNMP Traps across MXs
- Correlation of AirDefense Traps across MXs
- Periodic audts by *RingMaster*

Configurable notification filters can be set using the SNMP Manager to filter alarms by:

- Alarm Category
- Alarm Severity

Alarm Notifications Via SNMP Traps

The SNMP interface deals primarily with alarm notification.

- The *RingMaster Agent* generates SNMP v1 and v2c traps.
- The SNMP interface forwards alarms as SNMP traps, including alarms created and correlated from MX traps, alarms generated from *RingMaster* itself, and alarms collected from other sources, such as AirDefense traps.
- The *RingMaster* agent sends an SNMP trap when an alarm's state changes, such as when an alarm is cleared or acknowledged, or when it is updated.
- To deal with a burst of cleared or new alarms, the *RingMaster Agent* buffers traps at a configurable interval sends them during a specified interval. This update interval can be configured via The *RingMaster's* Web interface.

RingMaster Agent License

RingMaster Agent will be a licensed feature. The license SKU is **RMTS-AGENT** and it works just like the **RMTS-PLAN** license. It needs a base RMTS license installed first.

Product Code	SKU	Description
02	RMTS	Base license enabling support for up to 5 APs and one switch.
07	RMTS-AGENT	Enables RingMaster Agent feature

WebAPI Interface

The Web Services API provides a management interface. It allows third party applications to build interfaces or applications to access or manage devices and alarms. For example, an upstream application can retrieve the configuration of MPs in a *RingMaster* managed network domain. This can be more than a basic query with respect to information requested — for example, a set of MPs corresponding to certain serial numbers or MP type may be requested.

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Automatic Image Update

This feature allows users with a SafetyNet login to automatically download MSS software images from the Trapeze Networks support portal. In the past, customers had to connect to the Trapeze Networks support portal to download new software images for MXs. The auto update feature allows users to update software automatically on a scheduled or on-demand basis. Users will be notified when new MSS software is available or downloaded.

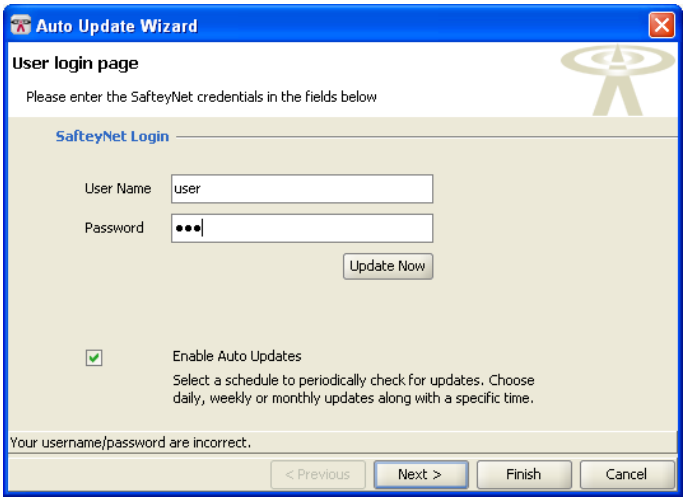
This feature performs the following:

- Checks and downloads any new, compatible MSS software images
- Provides the ability to set up automatic updates
- Allows you to specify the frequency and time for automatic updates
- Provides notification options for automatic updates:
  - Notifies when updates are available
  - Notifies when updates are downloaded
- Allows you to perform manual updates
- Provides progress information for manual updates
- Checks the current version of MSS software on MXs currently in a plan and displays/downloads only relevant software

Auto Update Wizard

The update panel will help you schedule auto updates or perform a manual update.

1. Select the **Upgrade** menu item on the **Tools** menu to bring up the following dialog:



You will be asked for a login **User Name** and **Password**. You can click a button to verify username and password and to **Update Now**.

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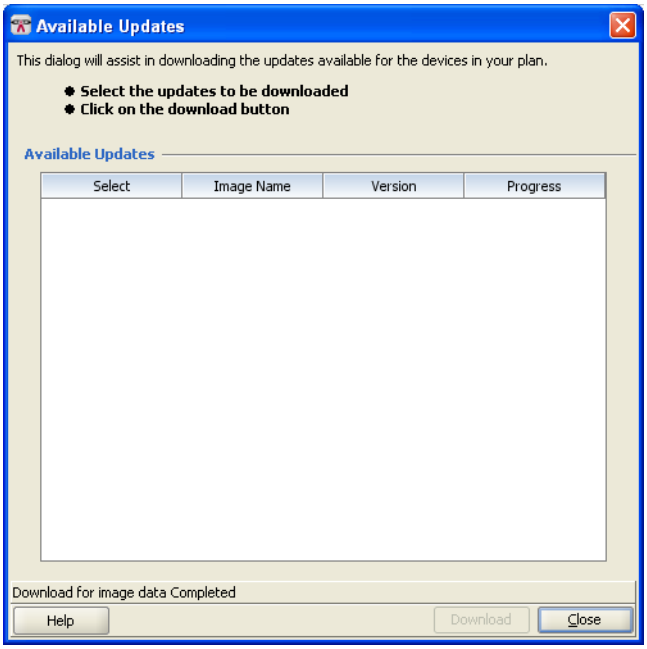
This button will check your **SafetyNet Login** User name and Password and confirm whether it is valid or not and if so you see the window below. This dialog will list and allow you to download updates when available. Click **Close** on this dialog.

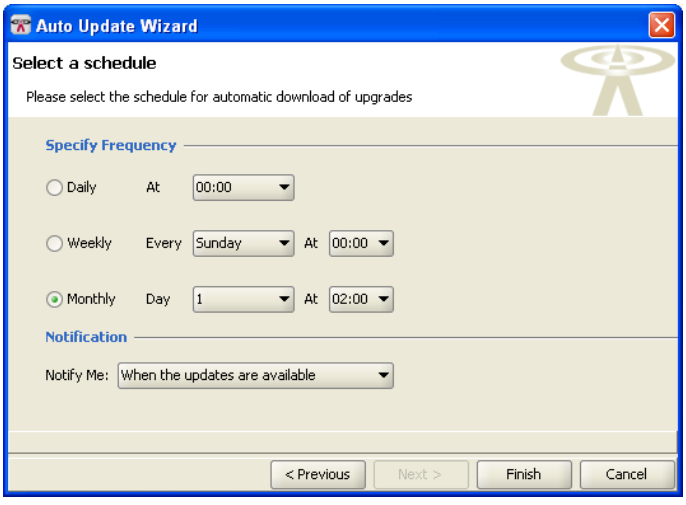


When you select a manual update, you see:

- A list of compatible new versions of software, if available, displayed in a table. You can select which software to download and click the **Download** button. If you select software, corresponding files are downloaded

The system will display the status of the download.

2. If you clicked the **Enable Auto Updates** check box on the previous dialog and clicked **Next** you see the following:



You have the option of scheduling an auto update or performing a manual update.

You can enable auto update, choose an update frequency at which to check the support portal:

- **Daily**

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- **Monthly**
- **Weekly**

If you select daily, you then select a time If you select weekly, you then select a day of the week and time. If you select monthly, you then select a date and time.

You are able to select one of the following actions:

- **Notify when the updates are available**
- **Notify after the updates have been downloaded**

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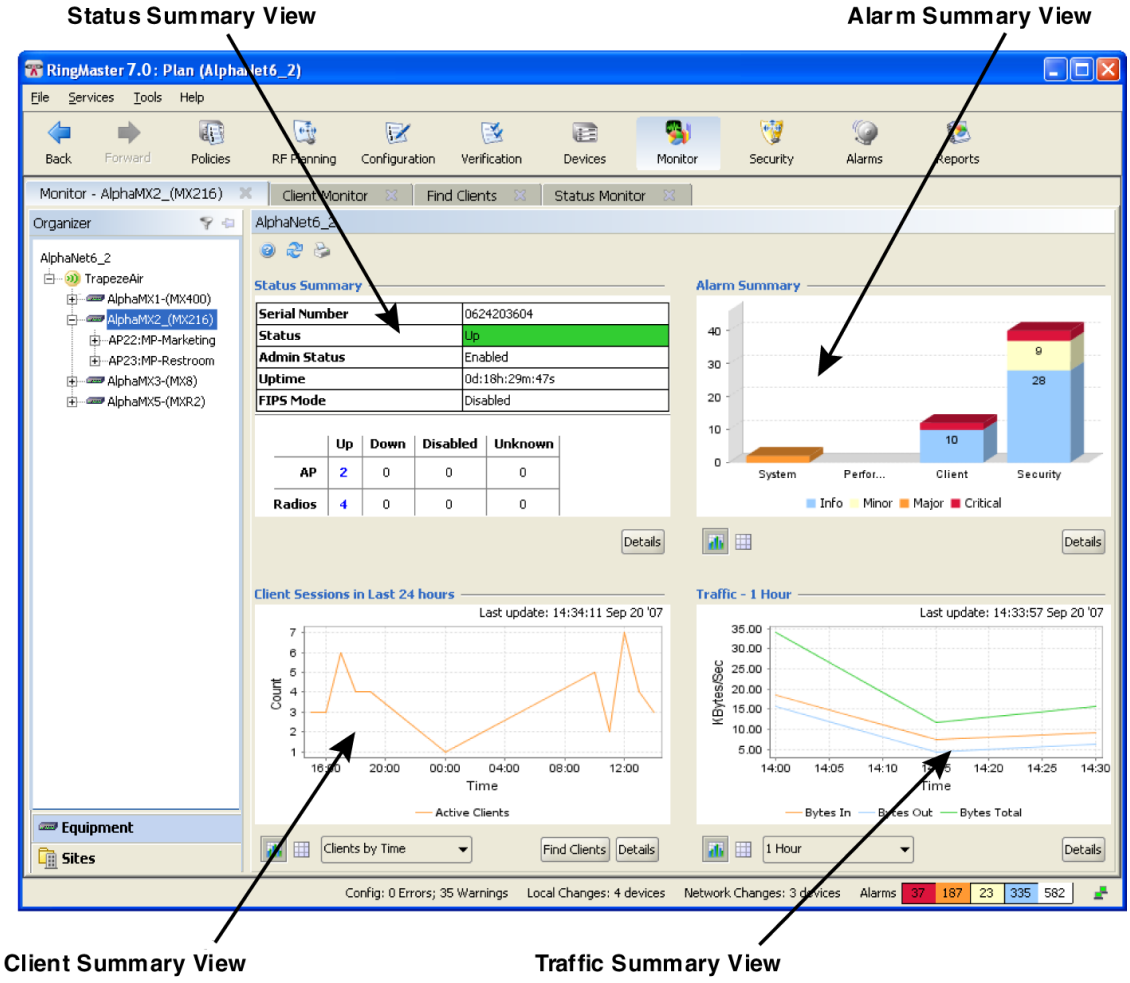
Monitor Function

This chapter highlights the Monitor function, which displays information retrieved by RingMaster. Monitor views show correlated data and let you navigate to details.

Monitoring Dashboards



Information is presented in a four-segment “dashboard” in the **Content** panel when you select the **Monitor** Navigation Bar button:

- **Status Summary** — Shows high-level status for Trapeze equipment. This view changes based on the selections in the **Organizer** panel — Domain, MX, AP or Radio can be selected.
- **Client Summary** — Shows activity, errors, and session information for network clients.
- **Alarm Summary** — Shows faults (alarms) for MXs.
- **Traffic/Radio Summary** — Shows Traffic Summary or Radio Summary depending on the object selected in the tree. If an MX is selected, this segment shows a Traffic Summary, but if an AP is selected the segment shows an RF Summary.

Each view provides answers to specific questions, such as the number of clients connected over the last hour, and which MX has the most traffic load. The **Status Summary**, **Alarms Summary**, **Clients**,

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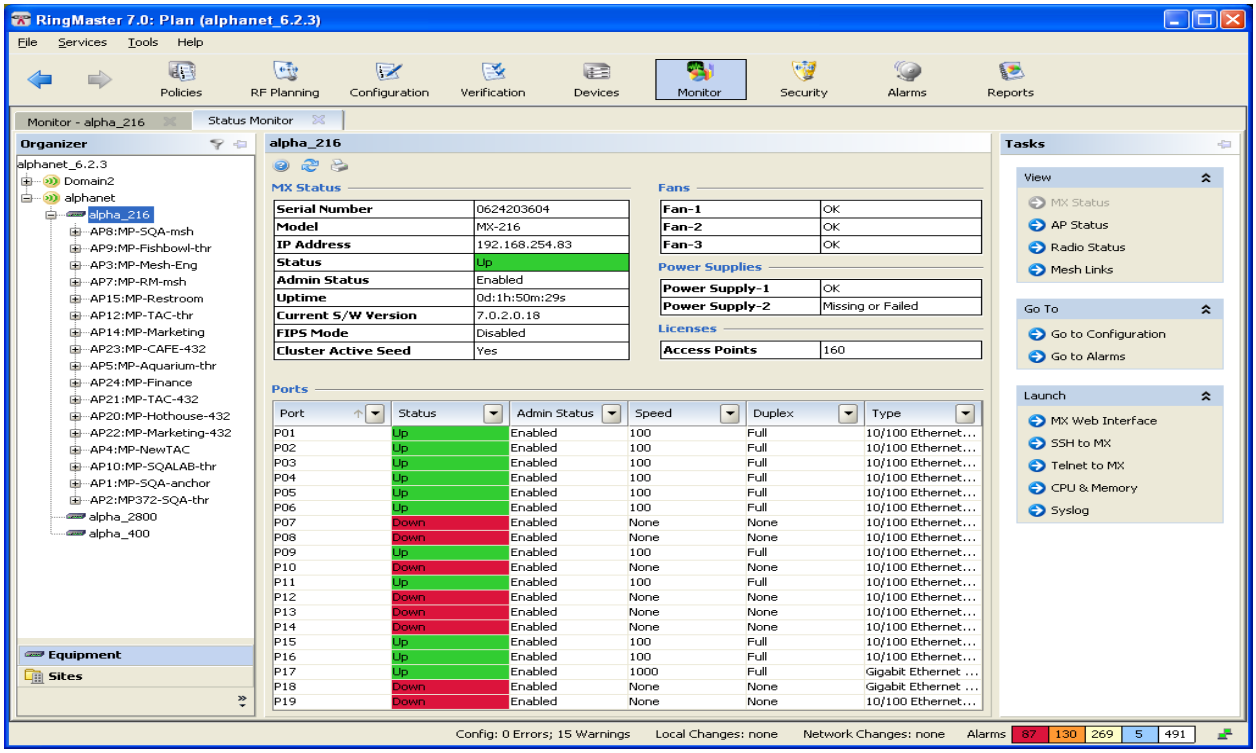
and **Radio** sections provide buttons so you can switch between graphical and tabular views in any area. These buttons allow you to see the data behind graphs. *RingMaster* provides many monitoring options. This section describes how to use these monitoring tools to determine problems that are reported.

Clicking the **Details** button in any subview (area) provides more information about data in that view. This chapter provides three monitoring examples to use as a guide to troubleshooting user connectivity issues in a network. For example, clicking on **Details** in the **Status Summary** area brings up a window like that shown below:



Requirements for Monitoring

To enable *RingMaster Services* to monitor network data, you must specify the MXs to monitor. *RingMaster Services* software collects data from these MXs and updates it in views under the **Monitor** Navigation Bar button for *RingMaster* clients. To specify the MXs to monitor, upload configurations into *RingMaster* or add them to a network plan. In addition, enable SNMP traps on the MXs. By default, the *RingMaster Services* supplies data to all views under the Monitor Navigation Bar button. This data is refreshed at regular intervals, according to the polling interval configured for *RingMaster Services*. The default polling interval is 15 minutes. You can optionally disable *RingMaster Services* from supplying data to specified views. To configure *RingMaster Services* for monitoring, see “Selecting Monitoring Settings” in the publication *RingMaster Planning Guide*. To enable SNMP traps on MXs, see “Configuring SNMP” in the publication *RingMaster Configuration Guide*

Network Types

Networks have varying requirements and expectations for network monitoring, depending on the type of network being monitored. The two most common network types are corporate or campus networks, and distributed networks with remote sites.

Corporate or Campus Networks

Corporate or campus networks have two to thirty two high-capacity MXs, such as MX-2800s. These networks can include a high number of APs and clients in a wide variety of location types, including

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multiple sites managed by a single *RingMaster* server. One or more mobility domains can be configured for this type of network. *RingMaster* has sufficient bandwidth to periodically collect detailed information from all MXs in such a network. With SNMP traps and all trending options enabled, *RingMaster* collects data and provides network-wide reports on demand. *RingMaster* provides an administrator with status and fault information, and the administrator can retrieve data at any time from a single MX or an entire network.

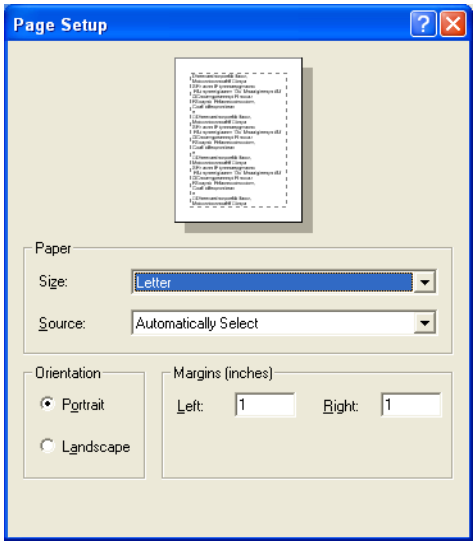
Distributed Networks with Remote Sites

Distributed networks with remote sites have a large number of smaller MXs, such as MX-R-2s or MX-8s, spread over a many sites — for example, branch offices or a chain of stores. Each site has few APs and clients. Domains may not be configured for mobility because sites are geographically distributed and each may have only a single MX. You can configure a network domain for this type of network. For distributed networks, *RingMaster* communicates with MXs over a WAN. You can turn off data collection and SNMP traps.

You can retrieve fault and status information, but cannot control what is collected or *RingMaster* polling intervals. With *RingMaster*, the administrator of a distributed network can monitor and diagnose a single site or MX by collecting data as needed.

While *RingMaster* collects graphical or tabular data, it might take longer to display data in one area than it does in another. Consequently, *RingMaster* displays the message **Loading data, please wait** in the chart or table area. However, *RingMaster* allows you to view data from another view while it collects data from the previously selected view. In other words, *RingMaster* will load selected data in the background so that you can view corresponding data in another section.

Refresh *RingMaster* data by clicking the **Refresh** icon . In addition, you can print displayed tables and graphs by clicking the **Print** icon .



Monitoring With RingMaster

Monitoring capabilities decribed below depend upon restrictions placed on users as described in **Restricted User Monitor View**.

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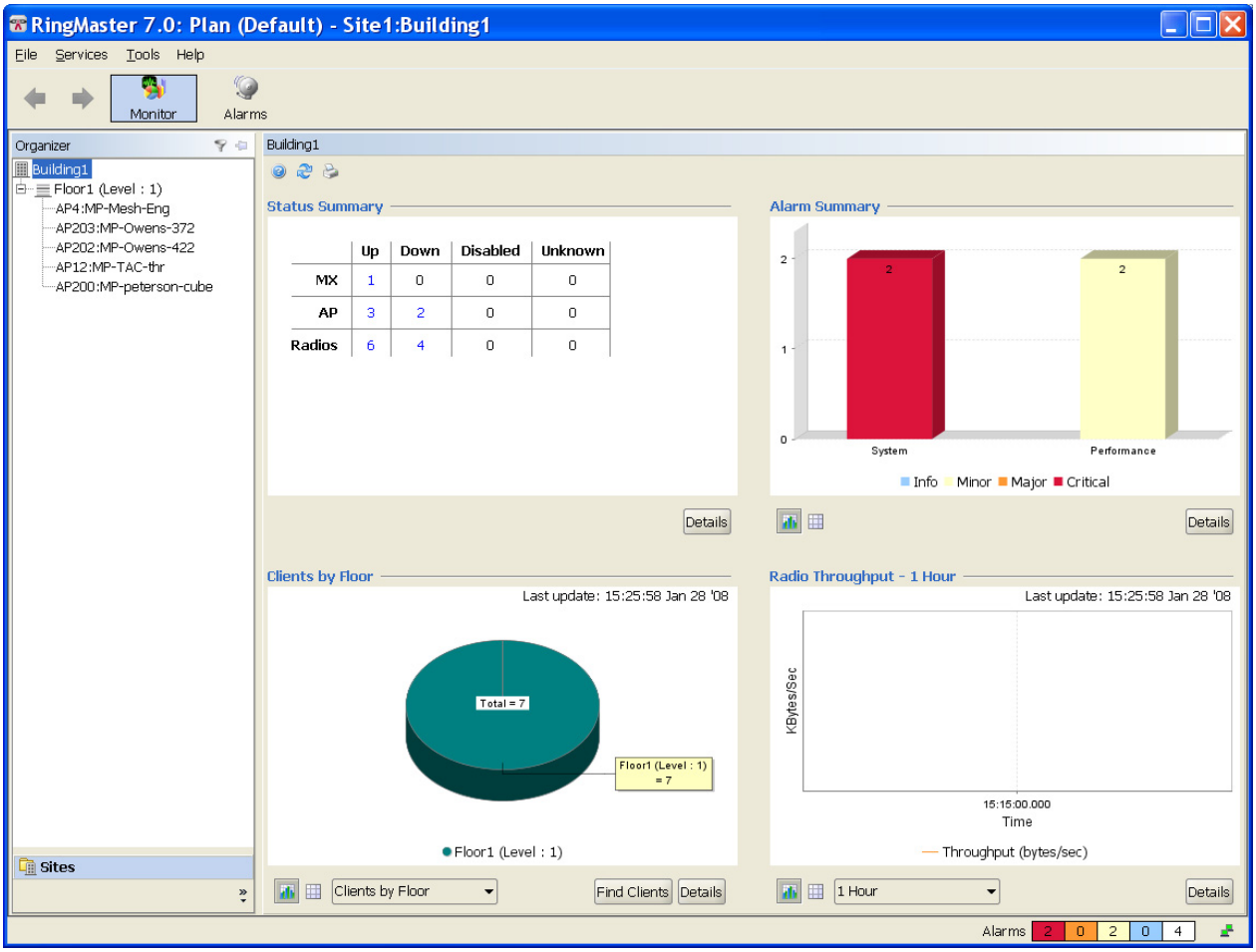
Restricted User Monitor View

Restricted users see a limited view after configuration, as shown in the example below:



This view shows only **Monitor** and **Alarms** buttons on the Navigation Bar.

- It does not show configuration error/warning counts, local/network change counts on the Status Bar.
- Alarm counts on the Status Bar are filtered based on view restrictions selected.

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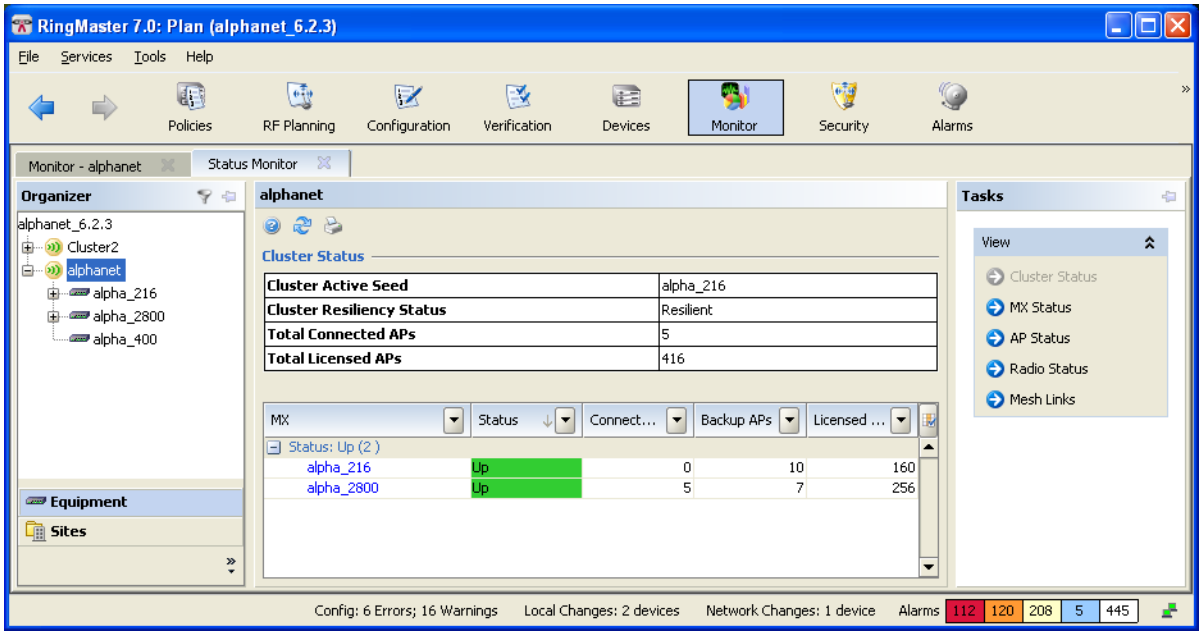
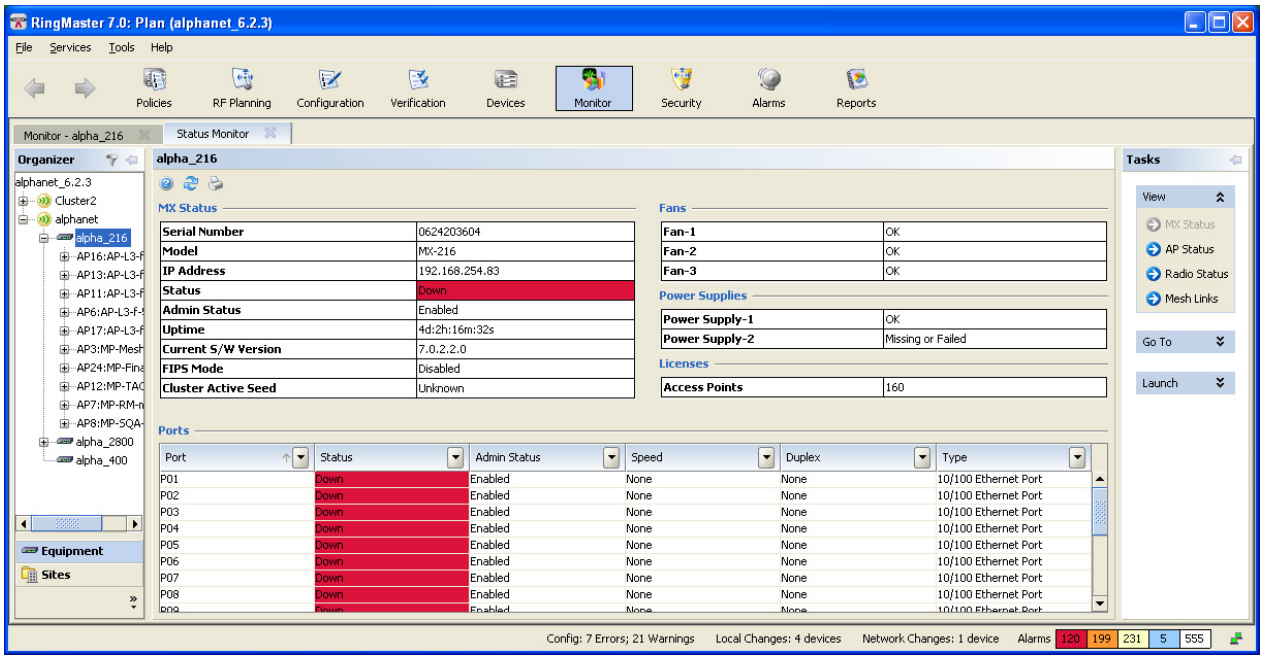
Cluster Status Monitoring

In the **Domain Status** panel, you can click on **Cluster Status** to see the following:



MX Status Monitoring

In the MX Status panel, *RingMaster* shows the status of **MX Status**, including **Fans**, **Power Supplies**, **Licenses** and a table of information about its **Ports**.



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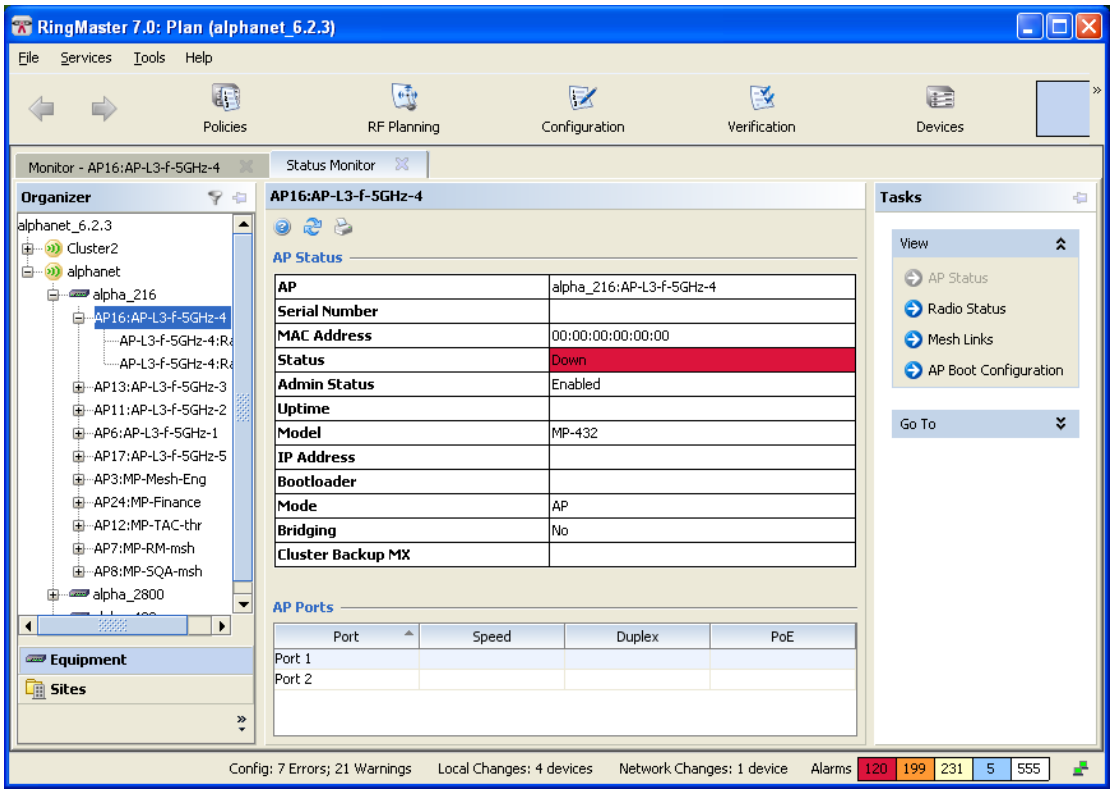
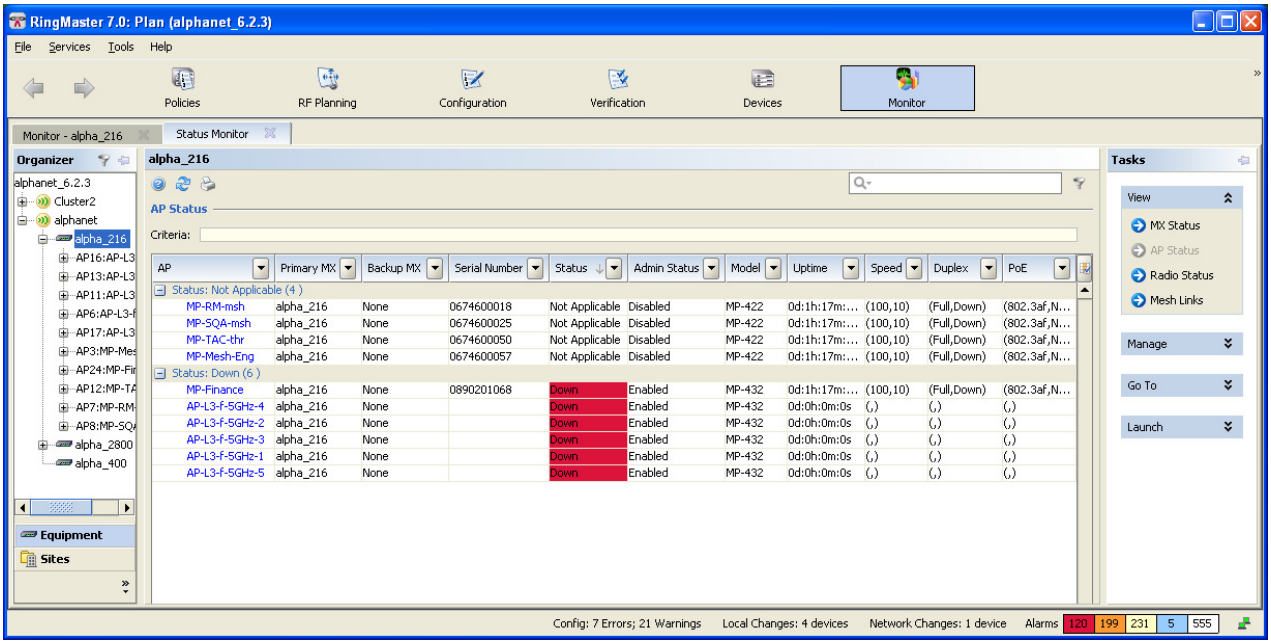
AP Status Monitoring

In the **AP Status** panel, *RingMaster* shows a new **AP Ports** table that lists **Port**, **Speed**, **Duplex**, and **PoE** for both ports.



In the **AP Status** table, there is a new column for **PoE**.


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies
RF Planning
Configuration
Verification
Devices
Monitor
Monitor - alpha_216
Status Monitor
Organizer
alpha_216
AP Status
Criteria:
AP Primary MX Backup MX Serial Number Status Admin Status Model Uptime Speed Duplex PoE
Status: Not Applicable (4)
MP-RM-msh alpha_216 None 0674600018 Not Applicable Disabled MP-422 0d:1h:17m:... (100,10) (Full,Down) (802.3af,N...
MP-SQA-msh alpha_216 None 0674600025 Not Applicable Disabled MP-422 0d:1h:17m:... (100,10) (Full,Down) (802.3af,N...
MP-TAC-thr alpha_216 None 0674600050 Not Applicable Disabled MP-422 0d:1h:17m:... (100,10) (Full,Down) (802.3af,N...
MP-Mesh-Eng alpha_216 None 0674600057 Not Applicable Disabled MP-422 0d:1h:17m:... (100,10) (Full,Down) (802.3af,N...
Status: Down (6)
MP-Finance alpha_216 None 0890201068 Down Enabled MP-432 0d:1h:17m:... (100,10) (Full,Down) (802.3af,N...
AP-L3-f-5GHz-4 alpha_216 None Down Enabled MP-432 0d:0h:0m:0s (,) (,) (,)
AP-L3-f-5GHz-2 alpha_216 None Down Enabled MP-432 0d:0h:0m:0s (,) (,) (,)
AP-L3-f-5GHz-3 alpha_216 None Down Enabled MP-432 0d:0h:0m:0s (,) (,) (,)
AP-L3-f-5GHz-1 alpha_216 None Down Enabled MP-432 0d:0h:0m:0s (,) (,) (,)
AP-L3-f-5GHz-5 alpha_216 None Down Enabled MP-432 0d:0h:0m:0s (,) (,) (,)
Tasks
View
MX Status
AP Status
Radio Status
Mesh Links
Manage
Go To
Launch
Config: 7 Errors; 21 Warnings
Local Changes: 4 devices
Network Changes: 1 device
Alarms 120 199 231 5 555

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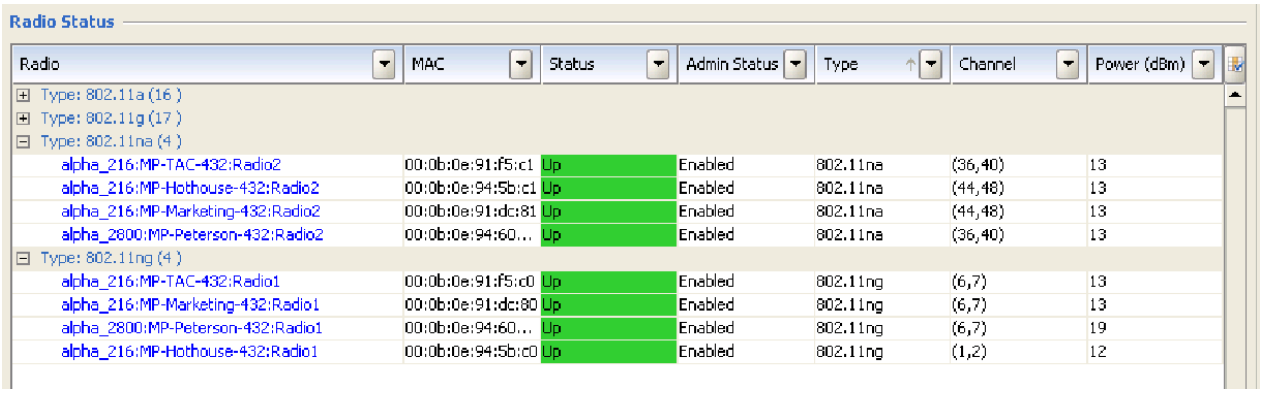
This table indicates both the Primary MX andd Backup MX that manage each AP. This provides an indication of MX failover fro Primary to Backup, and failback when a Primary “returns”.

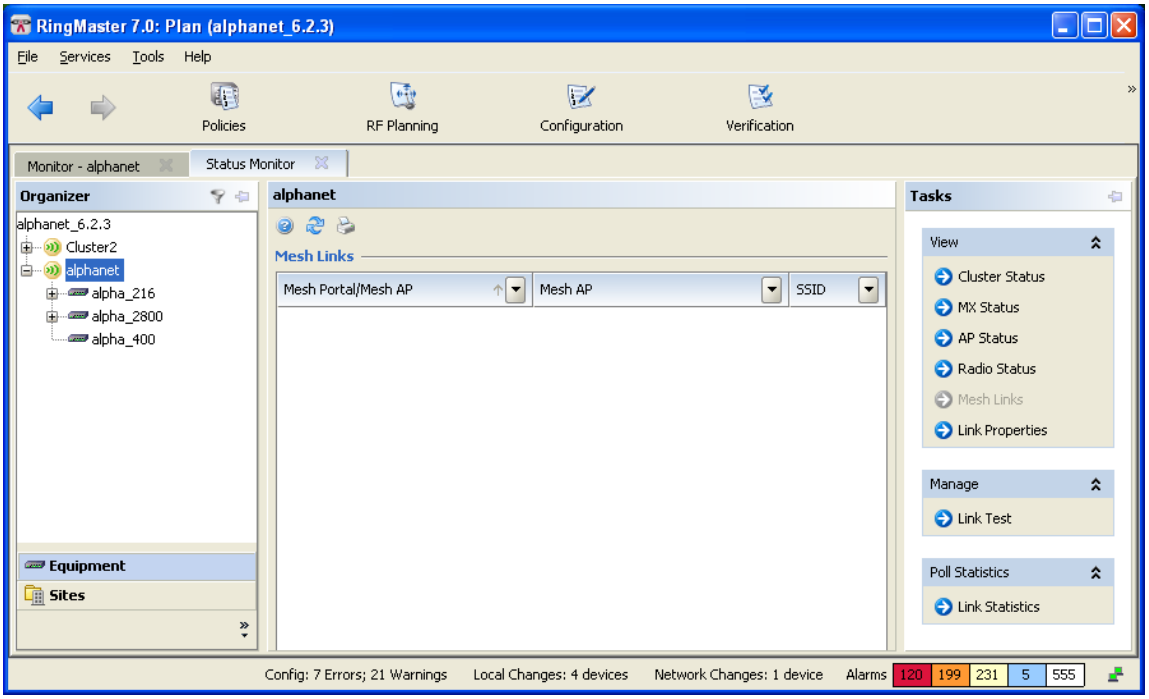
Radio Status Monitoring

RingMaster displays a **Radio Status** monitoring panel. The channel column shows both primary and secondary channels (MP-432s only) in a format of (44, 48). For a radio that is using single channel, the display format is just 44, as before.


Radio Status
Radio
MAC
Status
Admin Status
Type
Channel
Power (dBm)
Type: 802.11a (16)
Type: 802.11g (17)
Type: 802.11na (4)
alpha_216:MP-TAC-432:Radio2 00:0b:0e:91:f5:c1 Up Enabled 802.11na (36,40) 13
alpha_216:MP-Hothouse-432:Radio2 00:0b:0e:94:5b:c1 Up Enabled 802.11na (44,48) 13
alpha_216:MP-Marketing-432:Radio2 00:0b:0e:91:dc:81 Up Enabled 802.11na (44,48) 13
alpha_2800:MP-Peterson-432:Radio2 00:0b:0e:94:60... Up Enabled 802.11na (36,40) 13
Type: 802.11ng (4)
alpha_216:MP-TAC-432:Radio1 00:0b:0e:91:f5:c0 Up Enabled 802.11ng (6,7) 13
alpha_216:MP-Marketing-432:Radio1 00:0b:0e:91:dc:80 Up Enabled 802.11ng (6,7) 13
alpha_2800:MP-Peterson-432:Radio1 00:0b:0e:94:60... Up Enabled 802.11ng (6,7) 19
alpha_216:MP-Hothouse-432:Radio1 00:0b:0e:94:5b:c0 Up Enabled 802.11ng (1,2) 12

Mesh Links Monitoring

Mesh Links monitoring view shows the **Mesh Portal/Mesh AP**, **Mesh AP** and **SSID** of each mesh link.



You can select a mesh link and click on **Tasks** panel items to view **Link Properties**, perform a **Link Test**, or view **Link Statistics**.

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RF Neighborhood Monitoring

RF Neighborhood monitoring view shows the **Mesh Portal/Mesh AP**, **Mesh AP** and **SSID** of each mesh link.

You can select radio buttons to **Show RF Neighbors** by:

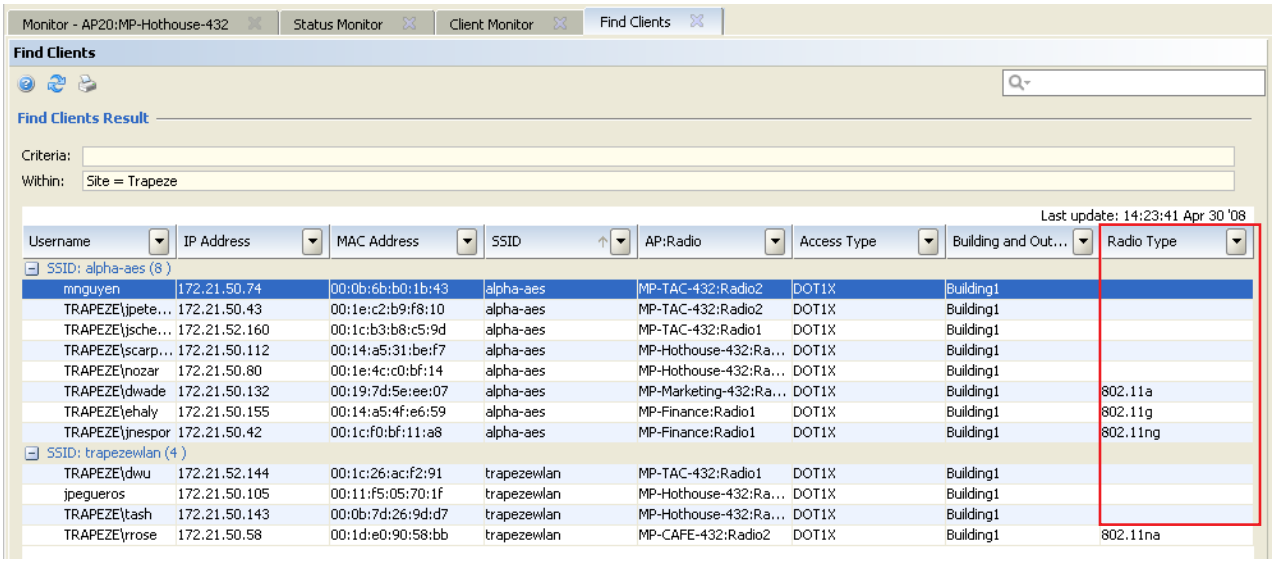
- **Transmitters (heard by this Radio)**
- **Listeners (who heard this Radio)**.

When you click **Refresh**, this dialog lists each **Neighbor**, **BSSID**, **Channel** and **RSSI** for **Trsnsmitters** or **Listeners**, based on which of these buttons is selected.

Client Session Monitoring

RingMaster Client **Session** monitoring changes include:

- *RingMaster Client* session shows the corresponding radio type for each client session.


Monitor - AP20:MP-Hothouse-432
Status Monitor
Client Monitor
Find Clients
Find Clients
Find Clients Result
Criteria:
Within: Site = Trapeze
Last update: 14:23:41 Apr 30 '08
Username
IP Address
MAC Address
SSID
AP:Radio
Access Type
Building and Out...
Radio Type
SSID: alpha-aes (8)
mnguyen 172.21.50.74 00:0b:6b:b0:1b:43 alpha-aes MP-TAC-432:Radio2 DOT1X Building1
TRAPEZE\jpete... 172.21.50.43 00:1e:c2:b9:f8:10 alpha-aes MP-TAC-432:Radio2 DOT1X Building1
TRAPEZE\jsche... 172.21.52.160 00:1c:b3:b8:c5:9d alpha-aes MP-TAC-432:Radio1 DOT1X Building1
TRAPEZE\scarp... 172.21.50.112 00:14:a5:31:be:f7 alpha-aes MP-Hothouse-432:Ra... DOT1X Building1
TRAPEZE\nozar 172.21.50.80 00:1e:4c:c0:bf:14 alpha-aes MP-Hothouse-432:Ra... DOT1X Building1
TRAPEZE\dwade 172.21.50.132 00:19:7d:5e:ee:07 alpha-aes MP-Marketing-432:Ra... DOT1X Building1 802.11a
TRAPEZE\ehaly 172.21.50.155 00:14:a5:4f:e6:59 alpha-aes MP-Finance:Radio1 DOT1X Building1 802.11g
TRAPEZE\jnespor 172.21.50.42 00:1c:f0:bf:11:a8 alpha-aes MP-Finance:Radio1 DOT1X Building1 802.11ng
SSID: trapezewlan (4)
TRAPEZE\dwu 172.21.52.144 00:1c:26:ac:f2:91 trapezewlan MP-TAC-432:Radio1 DOT1X Building1
jpegueros 172.21.50.105 00:11:f5:05:70:1f trapezewlan MP-Hothouse-432:Ra... DOT1X Building1
TRAPEZE\tash 172.21.50.143 00:0b:7d:26:9d:d7 trapezewlan MP-Hothouse-432:Ra... DOT1X Building1
TRAPEZE\rrose 172.21.50.58 00:1d:e0:90:58:bb trapezewlan MP-CAFE-432:Radio2 DOT1X Building1 802.11na

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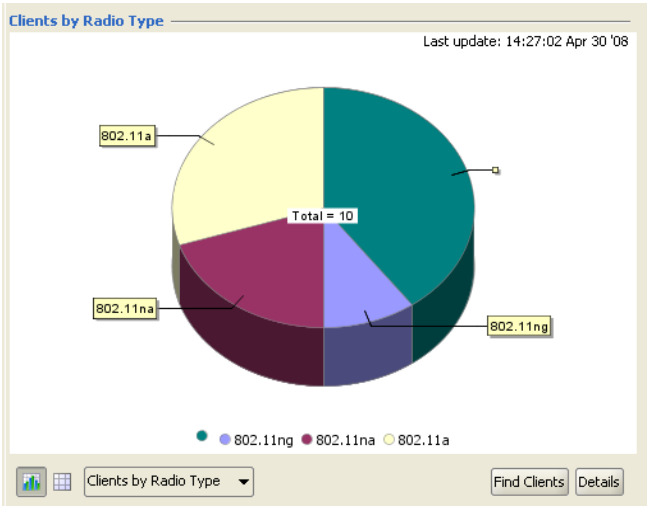
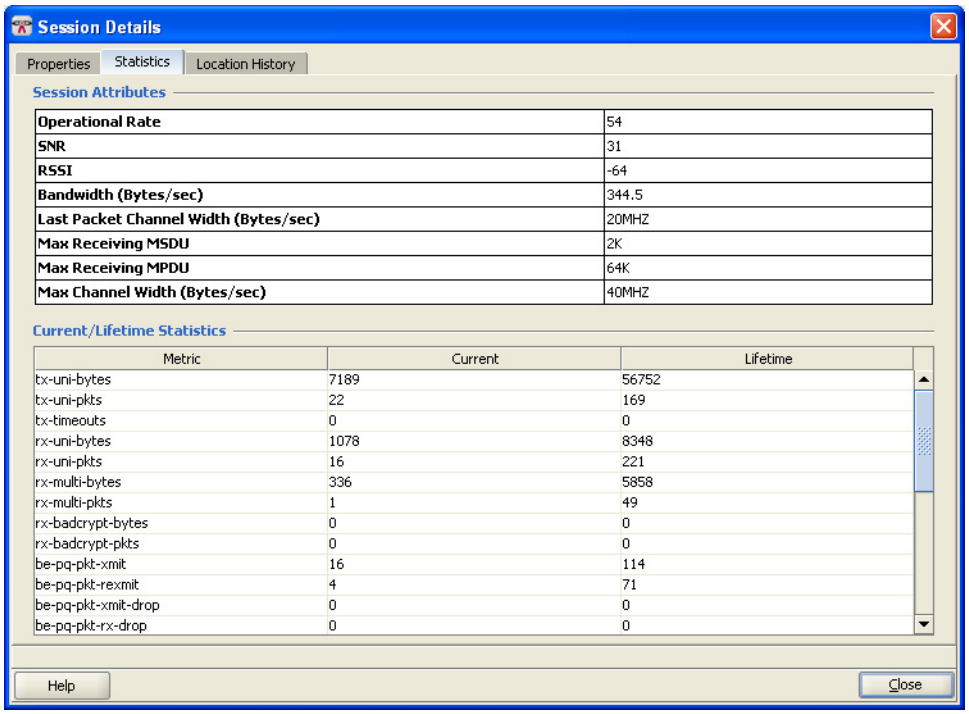
- *RingMaster* provides sorting based on radio type such as 11na and 11ng and identifies them as 11n clients.



- *RingMaster* also provides the following 11n related capabilities for client sessions in the **Client Session Details** dialog:
  - 11n maximum receiving MSDU rate
  - 11n maximum receiving MPDU rate
  - 11n maximum channel width



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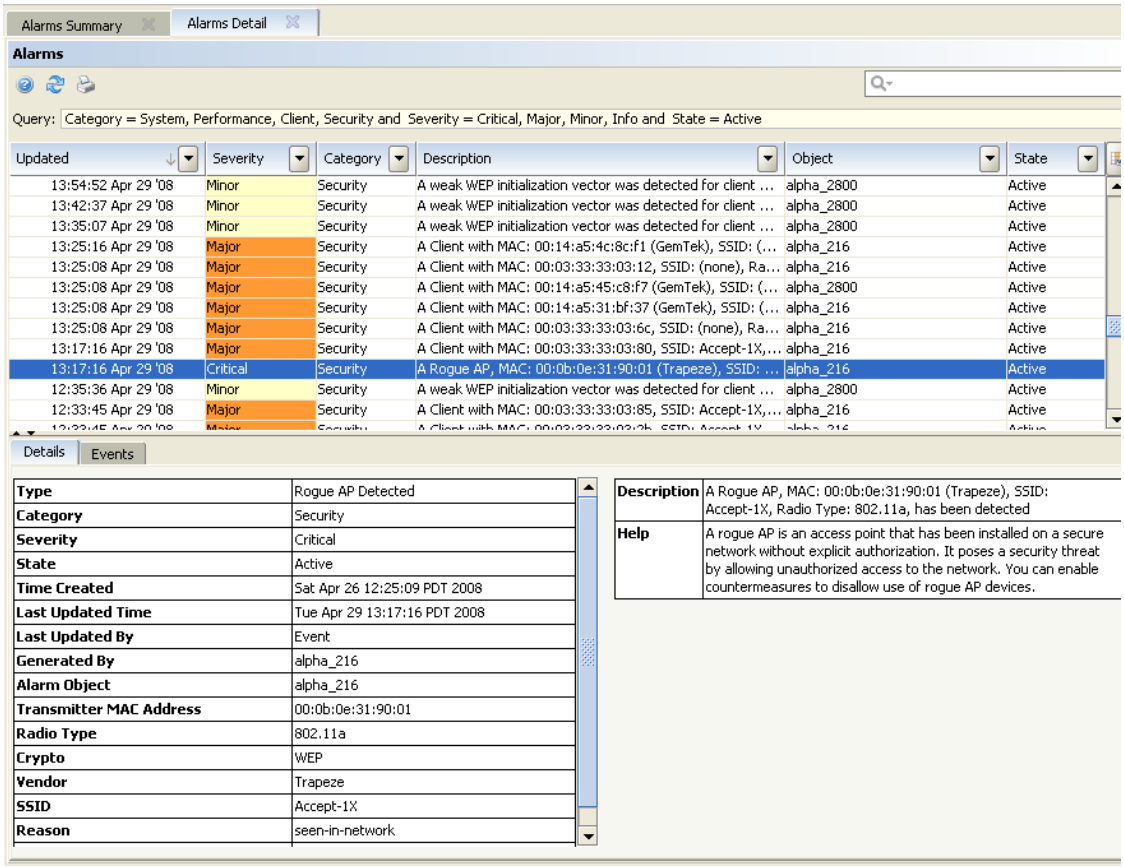
RF Detect Changes

RingMaster supports the following 11n related changes for Rogue Detection in the Security and Alarm Panel:

- *RingMaster* adds radio type information in the security alarm description identifying whether a rogue or suspect device is an 11n capable device. The radio type will also be added to alarm information.
- *RingMaster* adds channel width and secondary channel information to RF Detect listener information data.


Alarms Summary
Alarms Detail
Alarms
Query: Category = System, Performance, Client, Security and Severity = Critical, Major, Minor, Info and State = Active
Updated
Severity
Category
Description
Object
State
13:54:52 Apr 29 '08 Minor Security A weak WEP initialization vector was detected for client ... alpha_2800 Active
13:42:37 Apr 29 '08 Minor Security A weak WEP initialization vector was detected for client ... alpha_2800 Active
13:35:07 Apr 29 '08 Minor Security A weak WEP initialization vector was detected for client ... alpha_2800 Active
13:25:16 Apr 29 '08 Major Security A Client with MAC: 00:14:a5:4c:8c:f1 (GemTek), SSID: (... alpha_216 Active
13:25:08 Apr 29 '08 Major Security A Client with MAC: 00:03:33:33:03:12, SSID: (none), Ra... alpha_216 Active
13:25:08 Apr 29 '08 Major Security A Client with MAC: 00:14:a5:45:c8:f7 (GemTek), SSID: (... alpha_2800 Active
13:25:08 Apr 29 '08 Major Security A Client with MAC: 00:14:a5:31:bf:37 (GemTek), SSID: (... alpha_216 Active
13:25:08 Apr 29 '08 Major Security A Client with MAC: 00:03:33:33:03:6c, SSID: (none), Ra... alpha_216 Active
13:17:16 Apr 29 '08 Major Security A Client with MAC: 00:03:33:33:03:80, SSID: Accept-1X,... alpha_216 Active
13:17:16 Apr 29 '08 Critical Security A Rogue AP, MAC: 00:0b:0e:31:90:01 (Trapeze), SSID: ... alpha_216 Active
12:35:36 Apr 29 '08 Minor Security A weak WEP initialization vector was detected for client ... alpha_2800 Active
12:33:45 Apr 29 '08 Major Security A Client with MAC: 00:03:33:33:03:85, SSID: Accept-1X,... alpha_216 Active
Details
Events
Type Rogue AP Detected
Category Security
Severity Critical
State Active
Time Created Sat Apr 26 12:25:09 PDT 2008
Last Updated Time Tue Apr 29 13:17:16 PDT 2008
Last Updated By Event
Generated By alpha_216
Alarm Object alpha_216
Transmitter MAC Address 00:0b:0e:31:90:01
Radio Type 802.11a
Crypto WEP
Vendor Trapeze
SSID Accept-1X
Reason seen-in-network
Description A Rogue AP, MAC: 00:0b:0e:31:90:01 (Trapeze), SSID: Accept-1X, Radio Type: 802.11a, has been detected
Help A rogue AP is an access point that has been installed on a secure network without explicit authorization. It poses a security threat by allowing unauthorized access to the network. You can enable countermeasures to disallow use of rogue AP devices.

Reports

Due to monitoring changes in AP/Radio Status, Client Session monitoring, and RF Detect monitoring changes, there are corresponding changes to various reports related to these areas.

Status Summary Dashboard

The **Status Summary** dashboard is accessed by clicking **Details** in the upper left quadrant of the **Content** panel. When a site name is selected, and the **Equipment** tab at the bottom of the **Organizer**

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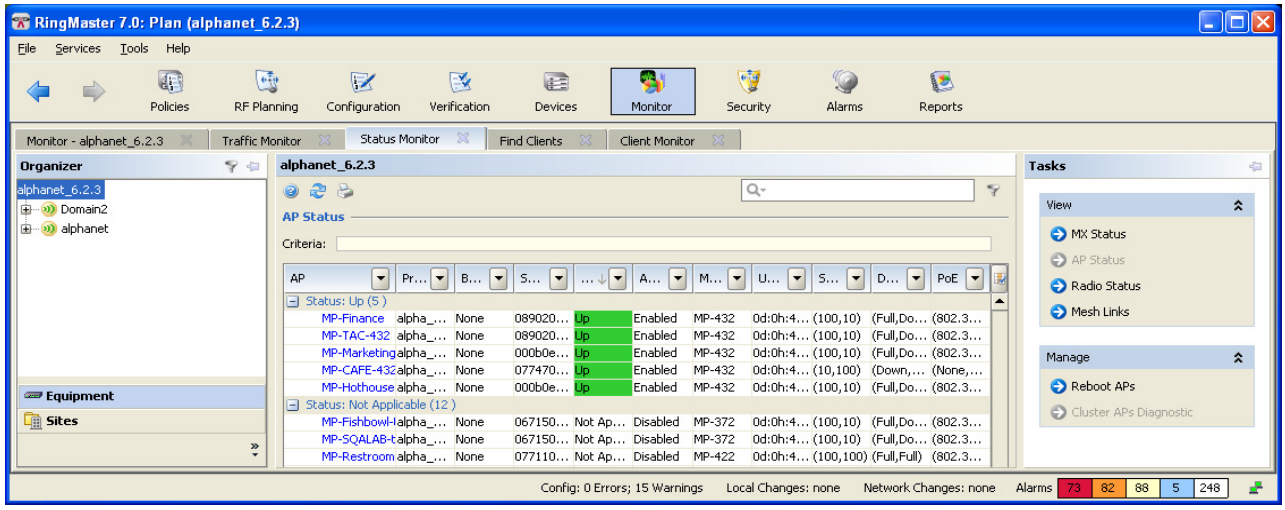
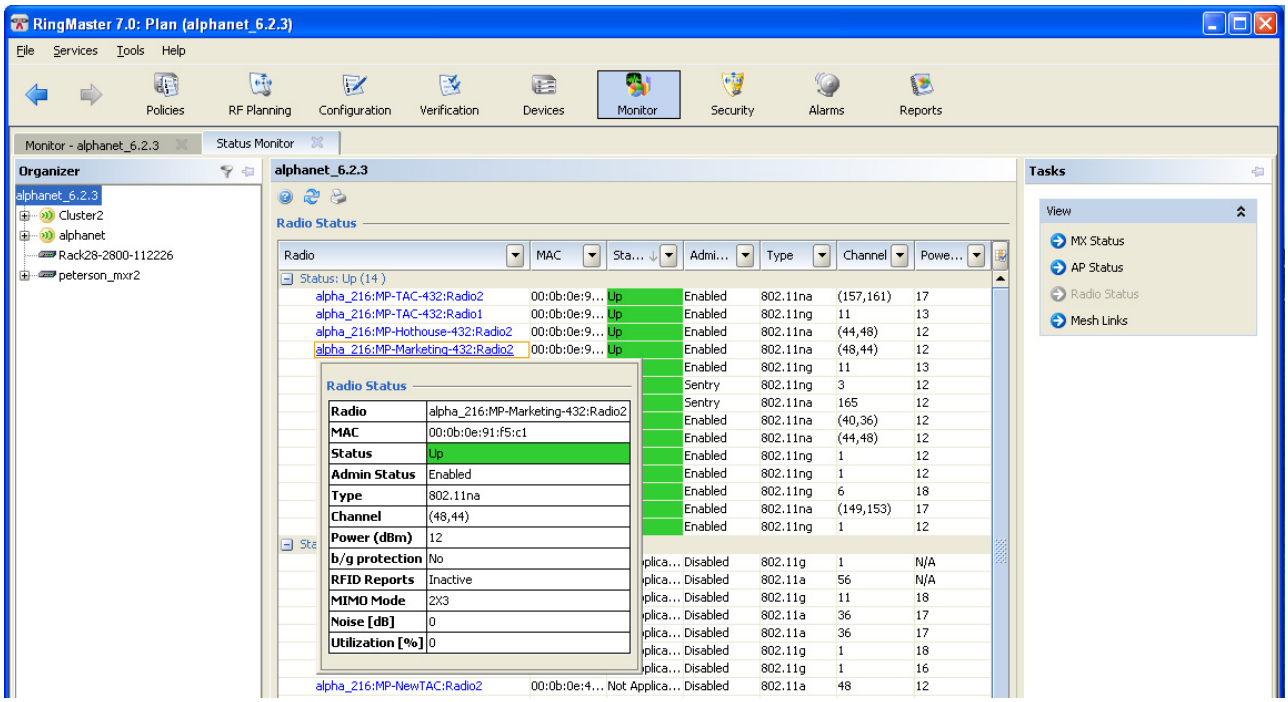
panel is selected, selecting the **Details** button to the right side of the **Status Summary** brings up a window like that shown below:


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Monitor - alphanet_6.2.3 Traffic Monitor Status Monitor Find Clients Client Monitor
Organizer
alphanet_6.2.3
Domain2
alphanet
Equipment
Sites
alphanet_6.2.3
AP Status
Criteria:
AP Pr... B... S... ... A... M... U... S... D... PoE
Status: Up (5)
MP-Finance alpha_... None 089020... Up Enabled MP-432 0d:0h:4... (100,10) (Full,Do... (802.3...
MP-TAC-432 alpha_... None 089020... Up Enabled MP-432 0d:0h:4... (100,10) (Full,Do... (802.3...
MP-Marketing alpha_... None 000b0e... Up Enabled MP-432 0d:0h:4... (100,10) (Full,Do... (802.3...
MP-CAFE-432 alpha_... None 077470... Up Enabled MP-432 0d:0h:4... (10,100) (Down,... (None,...
MP-Hothouse alpha_... None 000b0e... Up Enabled MP-432 0d:0h:4... (100,10) (Full,Do... (802.3...
Status: Not Applicable (12)
MP-Fishbowl-t alpha_... None 067150... Not Ap... Disabled MP-372 0d:0h:4... (100,10) (Full,Do... (802.3...
MP-SQALAB-t alpha_... None 067150... Not Ap... Disabled MP-372 0d:0h:4... (100,10) (Full,Do... (802.3...
MP-Restroom alpha_... None 077110... Not Ap... Disabled MP-422 0d:0h:4... (100,100) (Full,Full) (802.3...
Tasks
View
MX Status
AP Status
Radio Status
Mesh Links
Manage
Reboot APs
Cluster APs Diagnostic
Config: 0 Errors; 15 Warnings
Local Changes: none
Network Changes: none
Alarms 73 82 88 5 248

You can pass your cursor over a radio entry (in blue) to see details as shown below:



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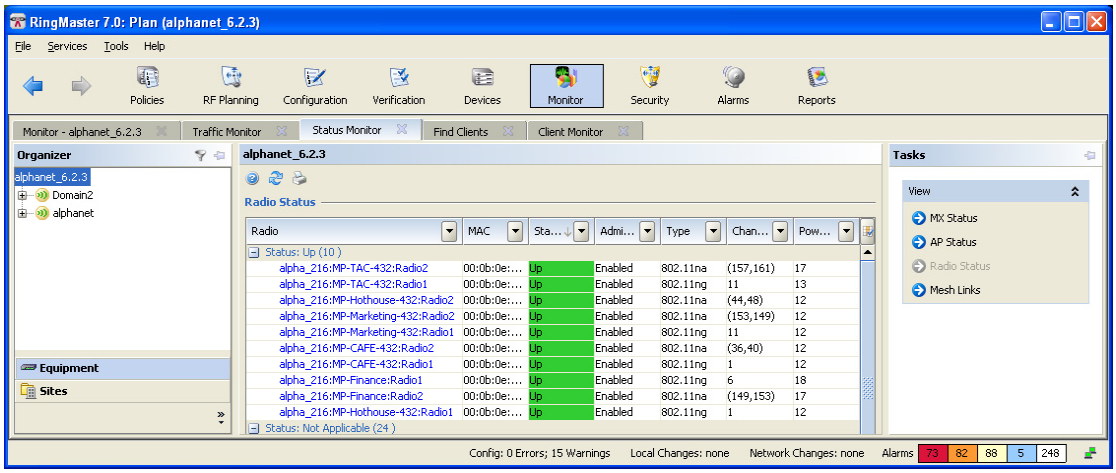
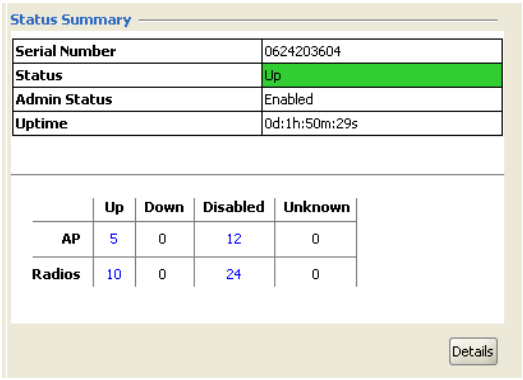
When in this view, you can click on **AP Status** or **Radio Status** to see views like that below:


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Monitor - alphanet_6.2.3 Traffic Monitor Status Monitor Find Clients Client Monitor
Organizer
alphanet_6.2.3
Domain2
alphanet
Equipment
Sites
alphanet_6.2.3
Radio Status
Radio MAC Sta... Admi... Type Chan... Pow...
Status: Up (10)
alpha_216:MP-TAC-432:Radio2 00:0b:0e:... Up Enabled 802.11na (157,161) 17
alpha_216:MP-TAC-432:Radio1 00:0b:0e:... Up Enabled 802.11ng 11 13
alpha_216:MP-Hothouse-432:Radio2 00:0b:0e:... Up Enabled 802.11na (44,48) 12
alpha_216:MP-Marketing-432:Radio2 00:0b:0e:... Up Enabled 802.11na (153,149) 12
alpha_216:MP-Marketing-432:Radio1 00:0b:0e:... Up Enabled 802.11ng 11 12
alpha_216:MP-CAFE-432:Radio2 00:0b:0e:... Up Enabled 802.11na (36,40) 12
alpha_216:MP-CAFE-432:Radio1 00:0b:0e:... Up Enabled 802.11ng 1 12
alpha_216:MP-Finance:Radio1 00:0b:0e:... Up Enabled 802.11ng 6 18
alpha_216:MP-Finance:Radio2 00:0b:0e:... Up Enabled 802.11na (149,153) 17
alpha_216:MP-Hothouse-432:Radio1 00:0b:0e:... Up Enabled 802.11ng 1 12
Status: Not Applicable (24)
Tasks
View
MX Status
AP Status
Radio Status
Mesh Links
Config: 0 Errors; 15 Warnings
Local Changes: none
Network Changes: none
Alarms 73 82 88 5 248

Using the Status Summary View

The **Status Summary** view shows the operational status and property details of equipment such as MXs, AP access points, and AP radios. For example, an MX can show a list of APs or radios, and the information for APs and radios can include the status and other relevant data.



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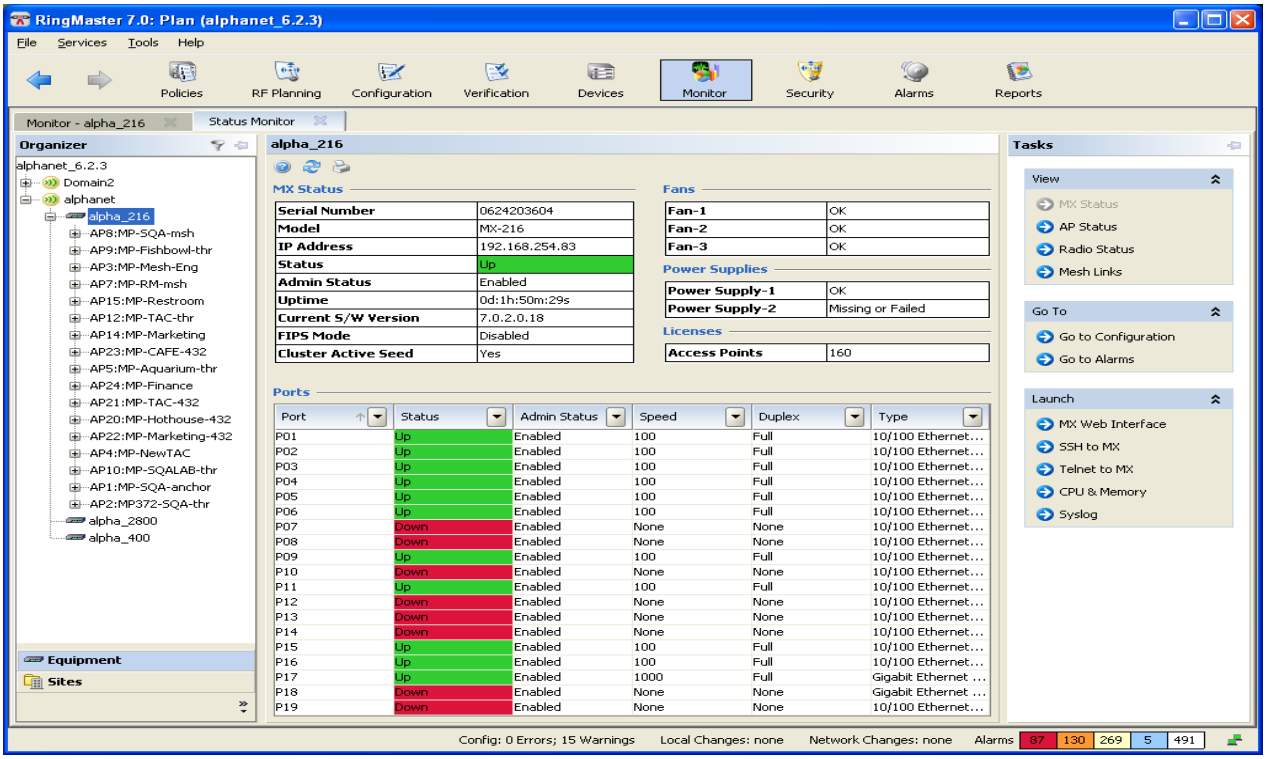
Status Monitor or Status Summary Details

The following screen shows the **Status Monitor** panel after clicking on the **Details** button in the **Status Summary** area.



Floor Viewer and Visualizations

You can select an AP access point from a **Monitoring Equipment** tree and display a floor map with an AP selected. From this view, you can generate visualizations of operational statistics such as RSSI, re-transmissions, SNR, and signal level in order to solve problems.

To find an AP on a floor:

1. Click on the **Monitor** button in the main *RingMaster* Navigation Bar.
2. Expand the site list tree in the **Organizer** panel and select an access point you want to view.

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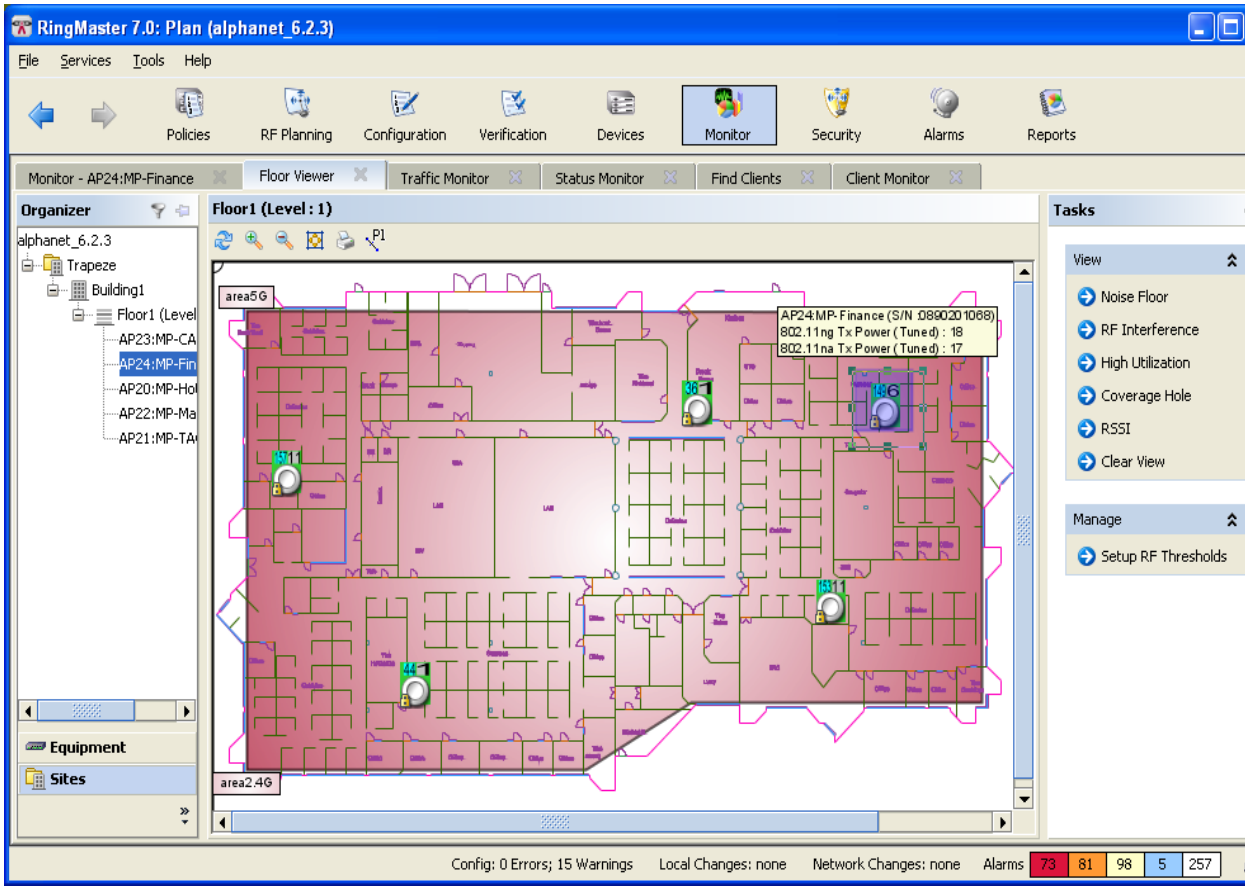
3. *RingMaster* automatically opens the **Floor View** panel, displaying a floor map with the selected access point highlighted.



From this window, there are visualization tools available in the **Tasks** panel including:

- **Noise Floor**
- **RF Interference**
- **High Utilization**
- **Coverage Hole**
- **Clear Visualization**

Also in the **Tasks** panel, there is a Manage panel option:

- **Setup RF Thresholds.**

Each of these tools is described next.

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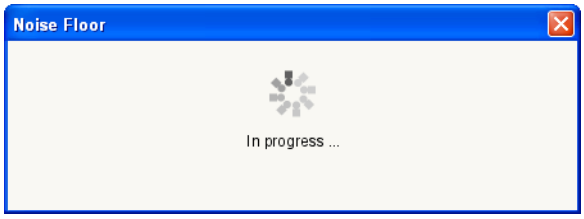
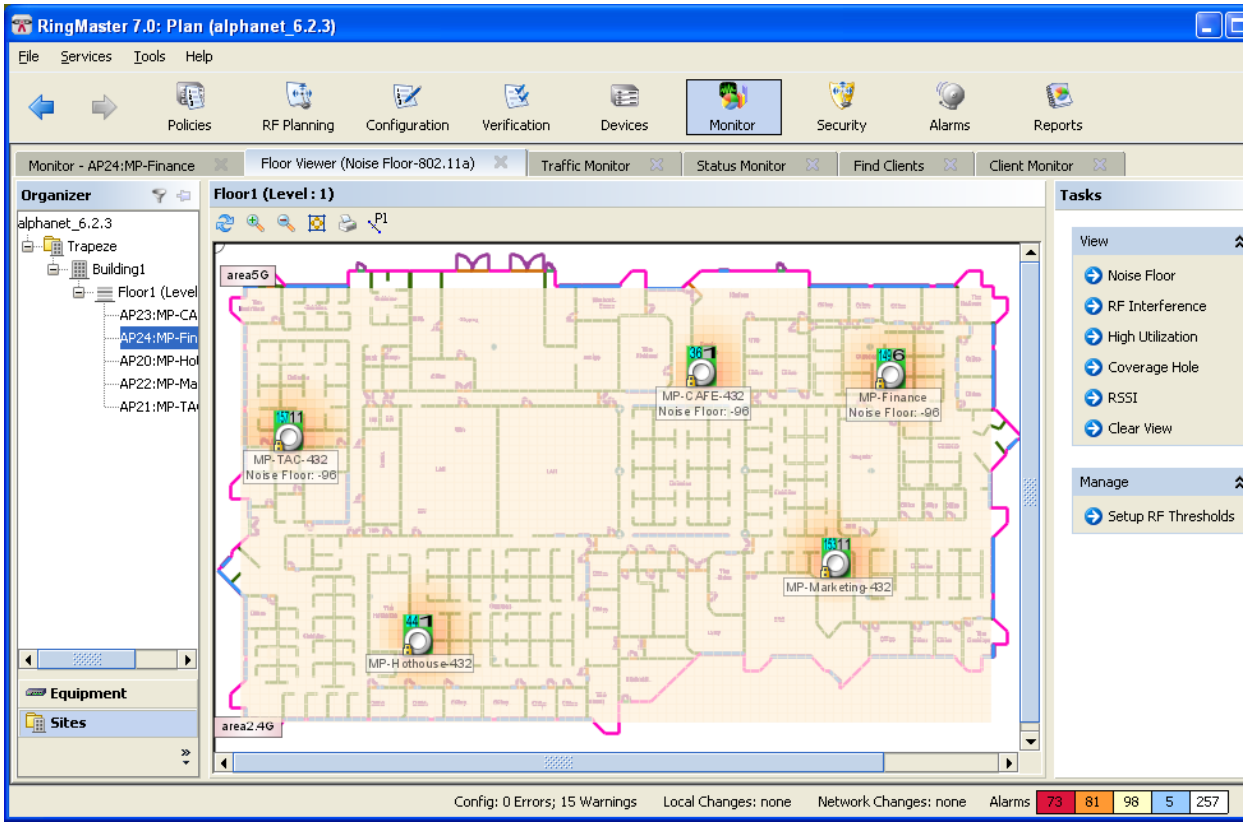
Noise Floor

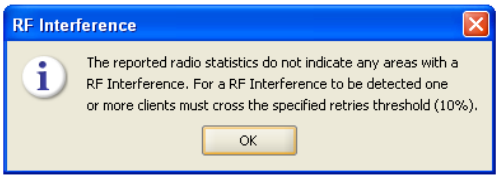
If you click on **Noise Floor** and select a technology from the pull-down menu, you see the a progress dialog and then the visualization window shown below:





RF Interference

If you click on **RF Interference**, you see a window showing areas where there is RF interference, and if none exists you see the following dialog:


RF Interference
The reported radio statistics do not indicate any areas with a RF Interference. For a RF Interference to be detected one or more clients must cross the specified retries threshold (10%).
OK

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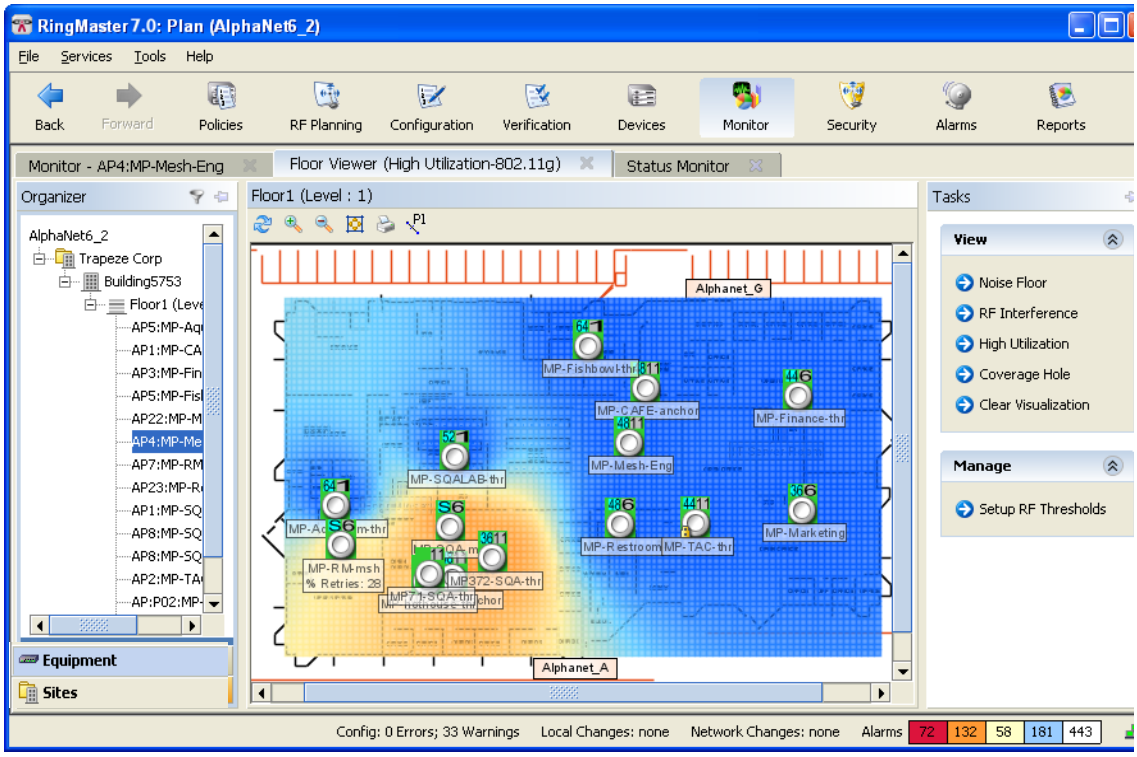
High Utilization

If you click on **High Utilization**, you see the following window:



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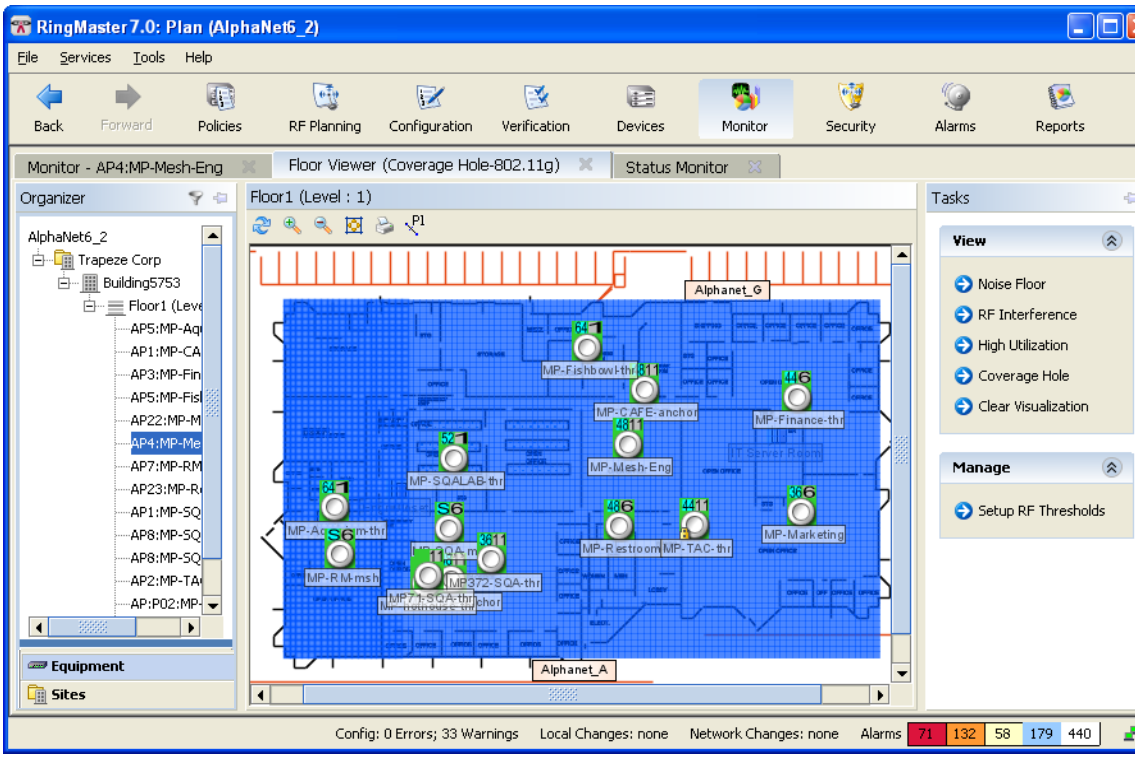
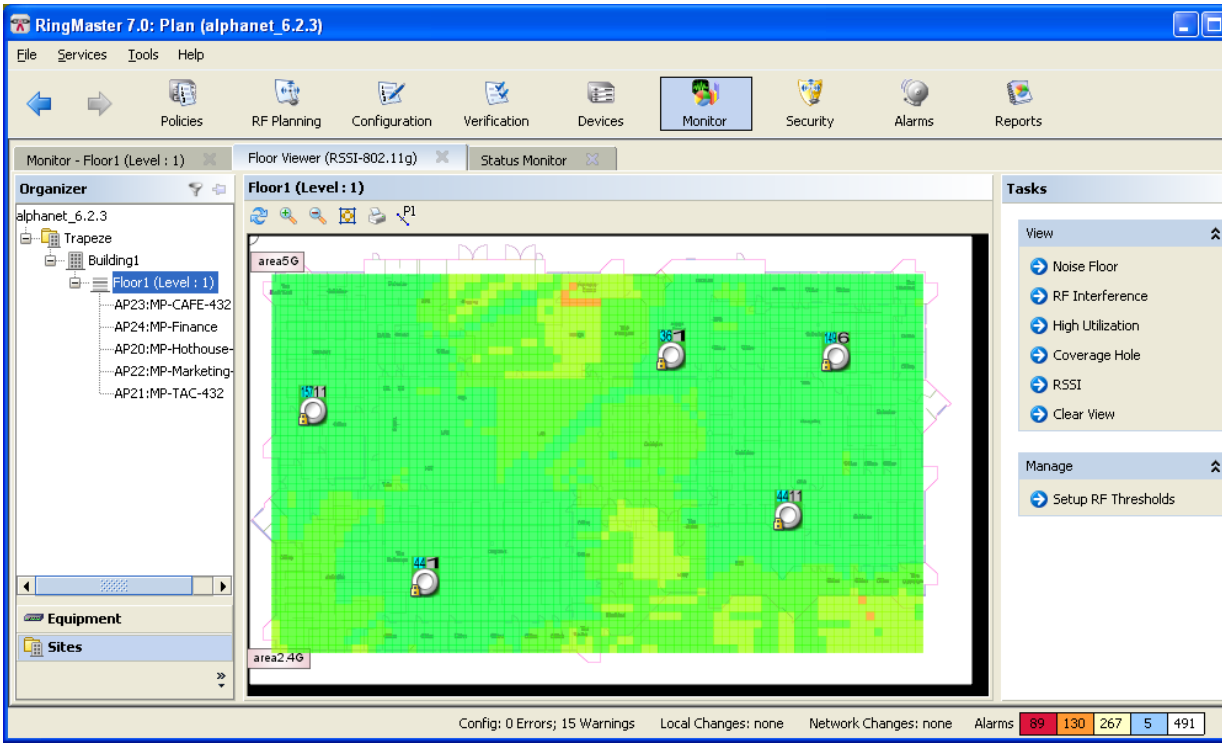
Coverage Hole

If you click on **Coverage Hole**, you see the following window (in this case showing no holes):



RSSI

If you click on **RSSI**, you see the following window:

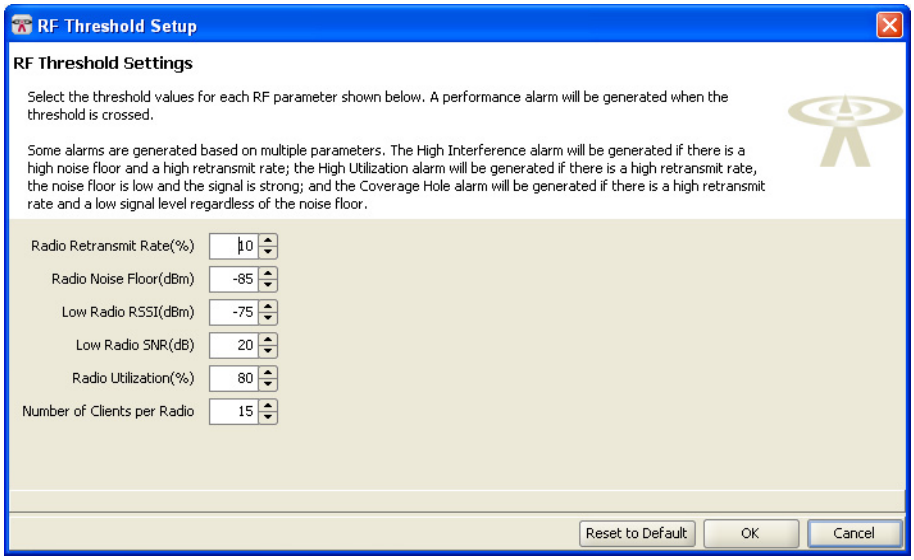


Clear View

If you click on **Clear View**, floor plan visualizations are cleared.

Setup RF Thresholds

If you click on **Setup RF Thresholds**, you see the following dialog:


RF Threshold Setup
RF Threshold Settings
Select the threshold values for each RF parameter shown below. A performance alarm will be generated when the threshold is crossed.
Some alarms are generated based on multiple parameters. The High Interference alarm will be generated if there is a high noise floor and a high retransmit rate; the High Utilization alarm will be generated if there is a high retransmit rate, the noise floor is low and the signal is strong; and the Coverage Hole alarm will be generated if there is a high retransmit rate and a low signal level regardless of the noise floor.
Radio Retransmit Rate(%) 10
Radio Noise Floor(dBm) -85
Low Radio RSSI(dBm) -75
Low Radio SNR(dB) 20
Radio Utilization(%) 80
Number of Clients per Radio 15
Reset to Default
OK
Cancel

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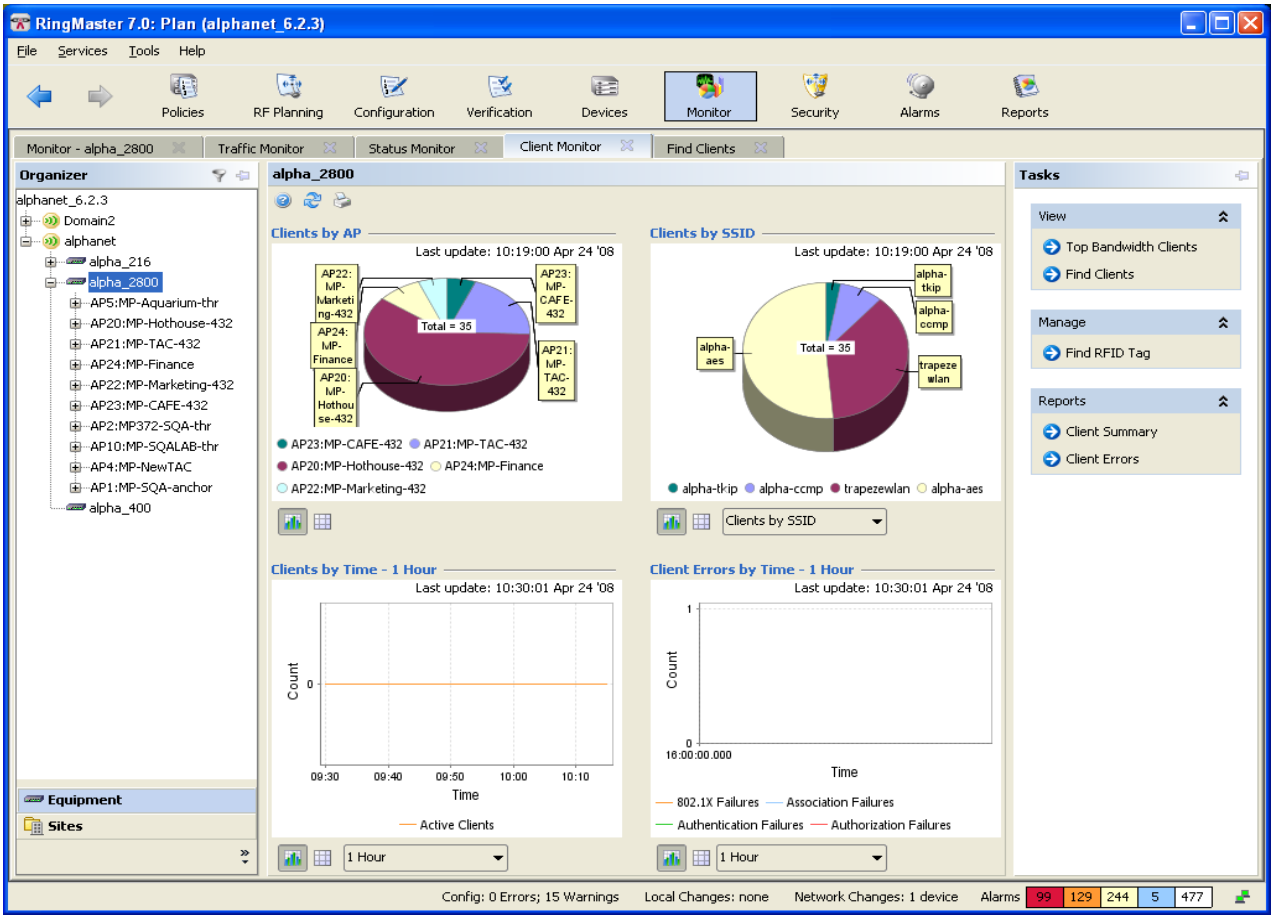
This dialog allows you to set threshold values for each of the following RF parameters:

- Radio Retransmit Rate (%)
- Radio Noise Floor (dBm)
- Low Radio RSSI (dBm)
- Low Radio SNR (dB)
- Radio Utilization (%)
- Number of Clients per Radio

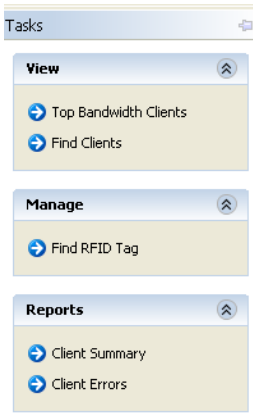
You can set values, use the **Reset to Default** button to clear changes, click **Cancel** to exit or **OK** to save changes and exit.

Client Monitor Dashboard

The **Client Monitor** dashboard is accessed by clicking **Details** in the **Content** panel and shows different graphs for clients by **Radio**, **Access Type**, **SSID**, **Radio Type** plus **Traffic** (in various intervals):



In this view, there are **Tasks** panel items including the following:

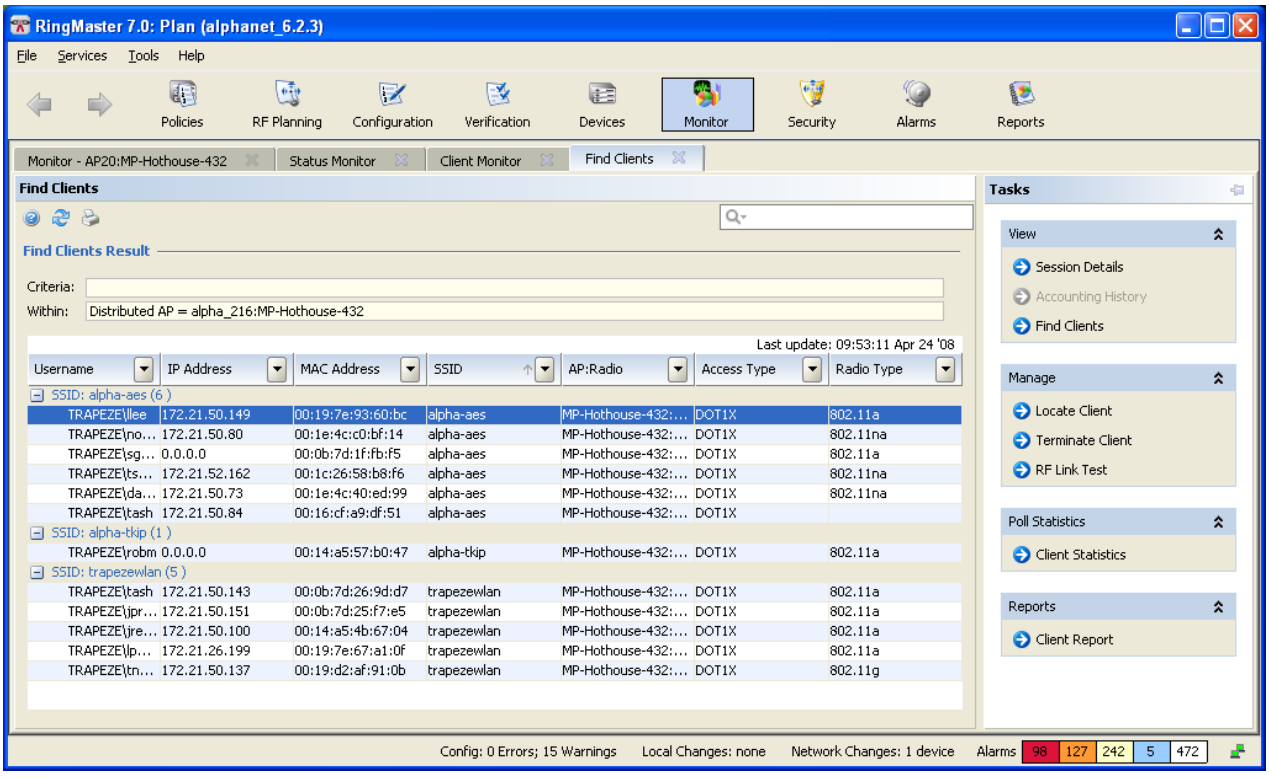


- View
  - **Top Bandwidth Clients**
  - **Find Clients**
- Manage
  - **RFID Tag**
- Reports
  - **Client Summary**
  - **Client Errors**

Options are either active or inactive for each item. Some data might not be available depending on scope and server setup options, but you can retrieve and view details of current sessions. Click on an active option to see more information. Inactive options will be gray.

Find Clients Dashboard

More client options are available from the **Find Clients** dashboard. These options under the **Find Clients** tab as shown below:


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Monitor - AP20:MP-Hothouse-432 Status Monitor Client Monitor Find Clients
Find Clients
Find Clients Result
Criteria:
Within: Distributed AP = alpha_216:MP-Hothouse-432
Last update: 09:53:11 Apr 24 '08
Username IP Address MAC Address SSID AP:Radio Access Type Radio Type
SSID: alpha-aes (6)
TRAPEZE\llee 172.21.50.149 00:19:7e:93:60:bc alpha-aes MP-Hothouse-432:... DOT1X 802.11a
TRAPEZE\no... 172.21.50.80 00:1e:4c:c0:bf:14 alpha-aes MP-Hothouse-432:... DOT1X 802.11na
TRAPEZE\sg... 0.0.0.0 00:0b:7d:1f:fb:f5 alpha-aes MP-Hothouse-432:... DOT1X 802.11a
TRAPEZE\ts... 172.21.52.162 00:1c:26:58:b8:f6 alpha-aes MP-Hothouse-432:... DOT1X 802.11na
TRAPEZE\da... 172.21.50.73 00:1e:4c:40:ed:99 alpha-aes MP-Hothouse-432:... DOT1X 802.11na
TRAPEZE\tash 172.21.50.84 00:16:cf:a9:df:51 alpha-aes MP-Hothouse-432:... DOT1X
SSID: alpha-tkip (1)
TRAPEZE\robm 0.0.0.0 00:14:a5:57:b0:47 alpha-tkip MP-Hothouse-432:... DOT1X 802.11a
SSID: trapezewlan (5)
TRAPEZE\tash 172.21.50.143 00:0b:7d:26:9d:d7 trapezewlan MP-Hothouse-432:... DOT1X 802.11a
TRAPEZE\jpr... 172.21.50.151 00:0b:7d:25:f7:e5 trapezewlan MP-Hothouse-432:... DOT1X 802.11a
TRAPEZE\jre... 172.21.50.100 00:14:a5:4b:67:04 trapezewlan MP-Hothouse-432:... DOT1X 802.11a
TRAPEZE\lp... 172.21.26.199 00:19:7e:67:a1:0f trapezewlan MP-Hothouse-432:... DOT1X 802.11a
TRAPEZE\tn... 172.21.50.137 00:19:d2:af:91:0b trapezewlan MP-Hothouse-432:... DOT1X 802.11g
Tasks
View
Session Details
Accounting History
Find Clients
Manage
Locate Client
Terminate Client
RF Link Test
Poll Statistics
Client Statistics
Reports
Client Report
Config: 0 Errors; 15 Warnings
Local Changes: none
Network Changes: 1 device
Alarms 98 127 242 5 472

In this view, there are **Tasks** panel items including the following:

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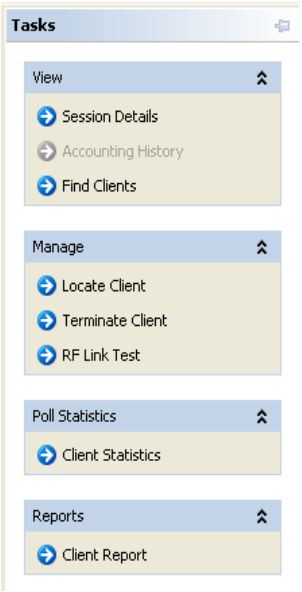
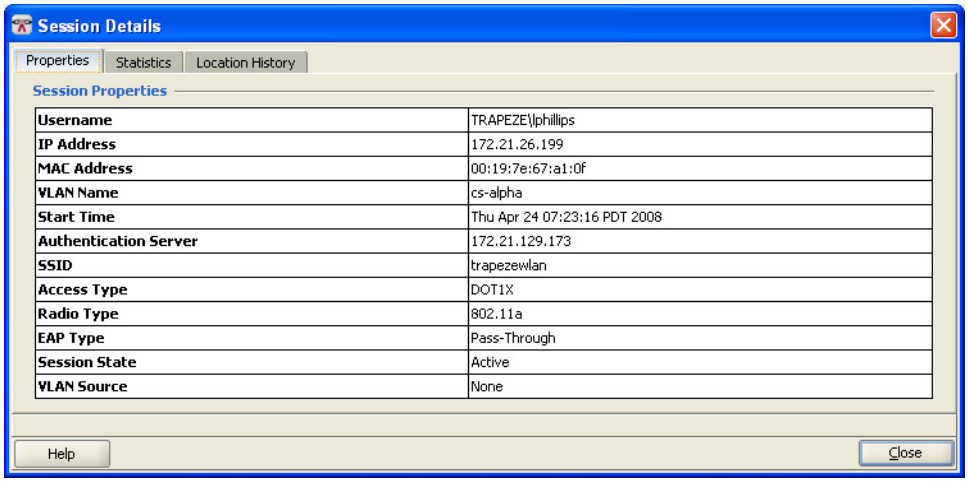


- View
  - **Session Details**
  - **Accounting History**
  - **Find Clients**
- Manage
  - **Locate Client**
  - **Terminate Client**
  - **RF Link Test**
- Poll Statistics
  - **Client Statistics**
- Reports
  - **Client Report**

Options are either active or inactive for each item. Some data might not be available depending on scope and server setup options, but you can retrieve and view details of current sessions. Click on an active option to see more information. Inactive options will be gray.

Session Details

The following screen provides a sample of the **Session Details** option for Clients by MX.



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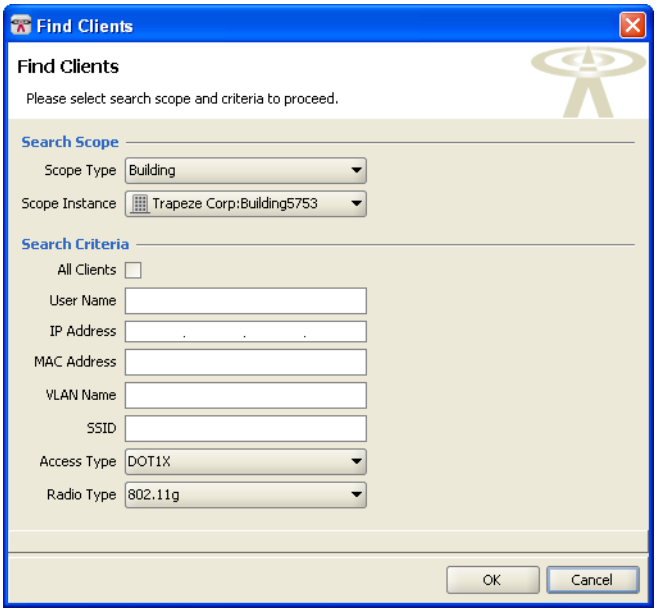
Finding a Client

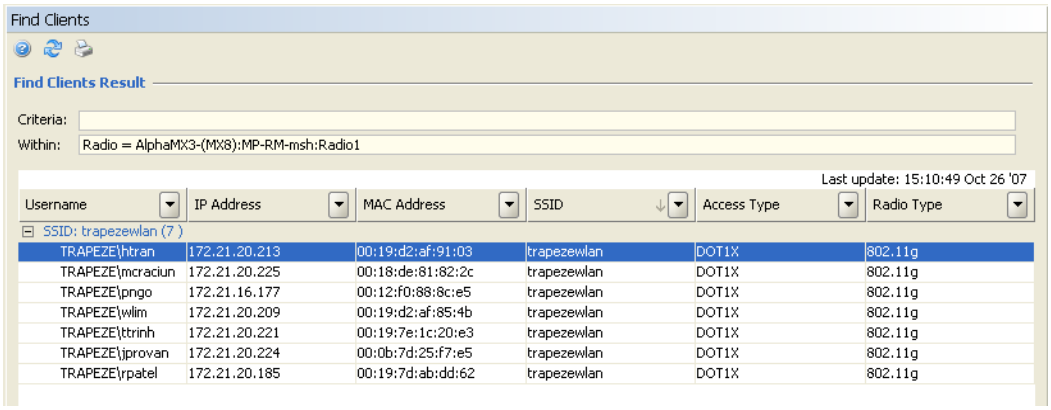
When the network level polling is disabled, do the following to monitor one or more clients:

1. From the **Client Monitor**, choose **Manage > Find Clients** in the **Task** panel to display the **Find Clients** dialog (shown below).



Find Client Results

2. Enter the desired search criteria, select the search scope, and click **Next** to display the **Find Client(s) Result** screen (shown below).



You can access the **Locate Client**, **Terminate Client**, and **RF Link Test** options as well.

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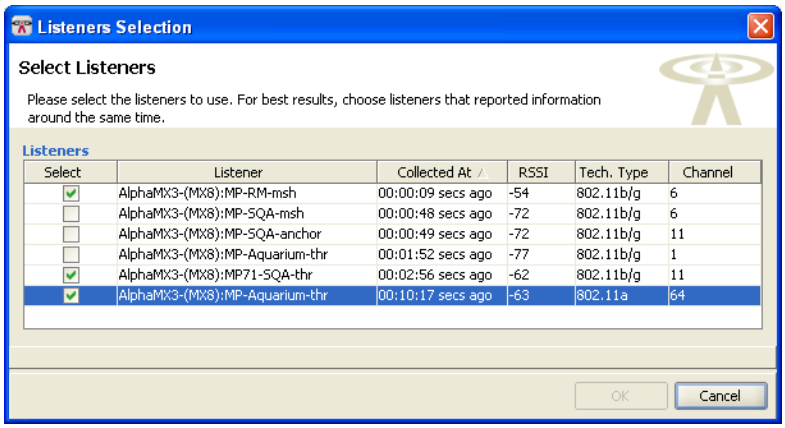
Locating A User

Display a user's approximate location by doing the following:

1. On the **Find Client(s) Result** screen, click the **Locate Client** task (under **Manage**). *RingMaster* retrieves information about a client's location and adds an icon on the floor plan.
2. If three or more APs have not detected the client within 15 seconds of each other, the **Select Listeners** dialog box appears, displaying a list of APs that have detected the client. You can select up to six APs from this list. *RingMaster* uses selected APs to calculate the location of a client.



3. *RingMaster* displays the approximate location of the client on the floor plan. The client's location is indicated with a laptop icon.
4. To refresh the list of APs that detect the client, click the (**Refresh Listeners**) button
5. To change the APs used for calculating the client's location, click the **Listeners** tab and select or deselect APs from the list, then click the (**Locate**) button.

Refreshing Client Data

RingMaster refreshes client monitor data at regular intervals (every 15 minutes by default). The administrator can specify the refresh rate using the client monitor polling interval. (See **Monitoring Settings**.) Click the **Refresh** icon to refresh data on demand. Counters are incremented each time the *RingMaster Services* receives a client activity trap generated by an MX. Counters represent activity for all clients within the selected scope.

Performing an RF Link Test

Running an RF Link Test can provide a quick, simple summary and breakdown of basic RF statistics for troubleshooting wireless performance problems. When an RF Link Test is started, it sends 20 null data packets from the associated AP to the client.

This returns the following information:

- Number of null data packets sent
- Number of null data packets received and acknowledged
- Transmission time for each null packet
- Indication of signal strength relative to the AP
- Signal-to-noise ratio (SNR)

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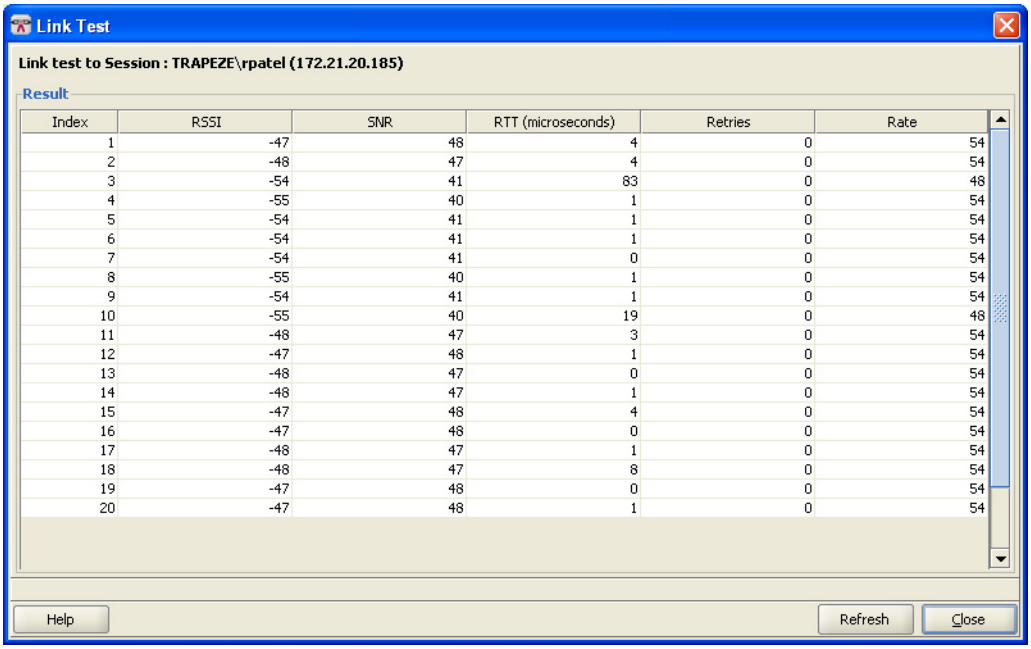
To perform an RF Link Test:

1. Select a user on the Client(s) Result screen.

Or

In the **Client Monitor** panel, select a user from the table.

2. Choose **Manage > RF Link Test** in the **Tasks** panel to run a link test and display the **Link Test** results dialog, as shown below.



3. Click the **Refresh** button to perform another link test and repopulate the **RF Link Test** table with new data.

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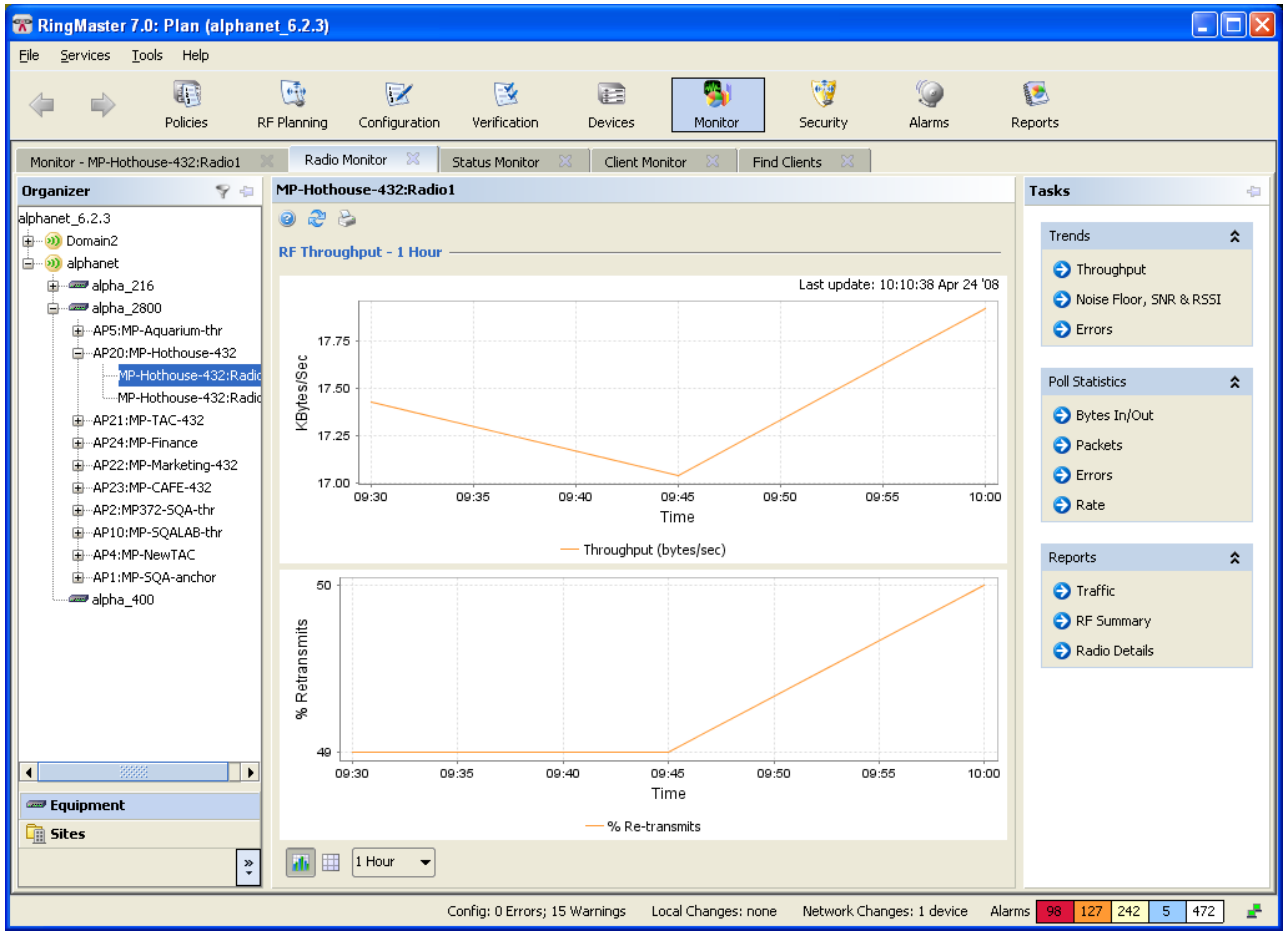
Traffic Monitor Dashboard

The lower right corner of the **Content** panel shows network usage and summary data. If you click on **Details** in this area, you access the **Traffic Monitor** dashboard. *RingMaster* shows bytes and packet counter statistics for the following scopes:



In this view, there are **Tasks** panel items including the following:

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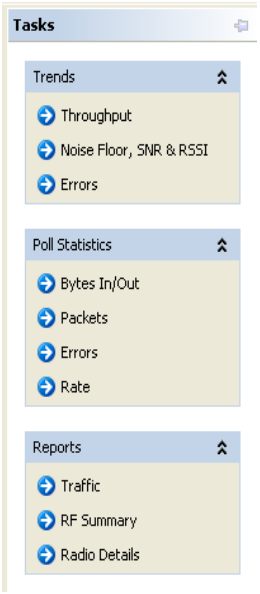

- Trends
  - **Throughput**
  - **Noise Floor, SNR & RSSI**
  - **Errors**
- Statistics
  - **Bytes In/Out**
  - **Packets**
  - **Errors**
  - **Rate**
- Reports
  - **Traffic**
  - **RF Summary**
  - **Radio Details**

Using Traffic Summary View

The **Traffic Summary** view displays network usage and RF summary data. *RingMaster* shows both traffic and RF statistics for Radio, AP, Floor, Building, and Site options, but only traffic data is applicable for MS, Mobility Domain, and Network Plan options. Click the tabular icon or the graph icon to switch between the chart and table views.

The following options are available for MX, Mobility Domain, and Network Plan:

❑ **1 Hour**	❑ **7 Days**	❑ **3 Months**	❑ **1 Year**
❑ **24 Hours**	❑ **30 Days**	❑ **6 Months**	❑

The following options are available for Radio, AP, Floor, Building, and Site:

❑ **1 Hour (Radio)**	❑ **7 Days (Radio)**	❑ **1 Hour (Traffic)**	❑ **7 Days (Traffic)**
❑ **24 Hour (Radio)**	❑ **30 Days (Radio)**	❑ **24 Hour (Traffic)**	❑ **30 Days (Traffic)**

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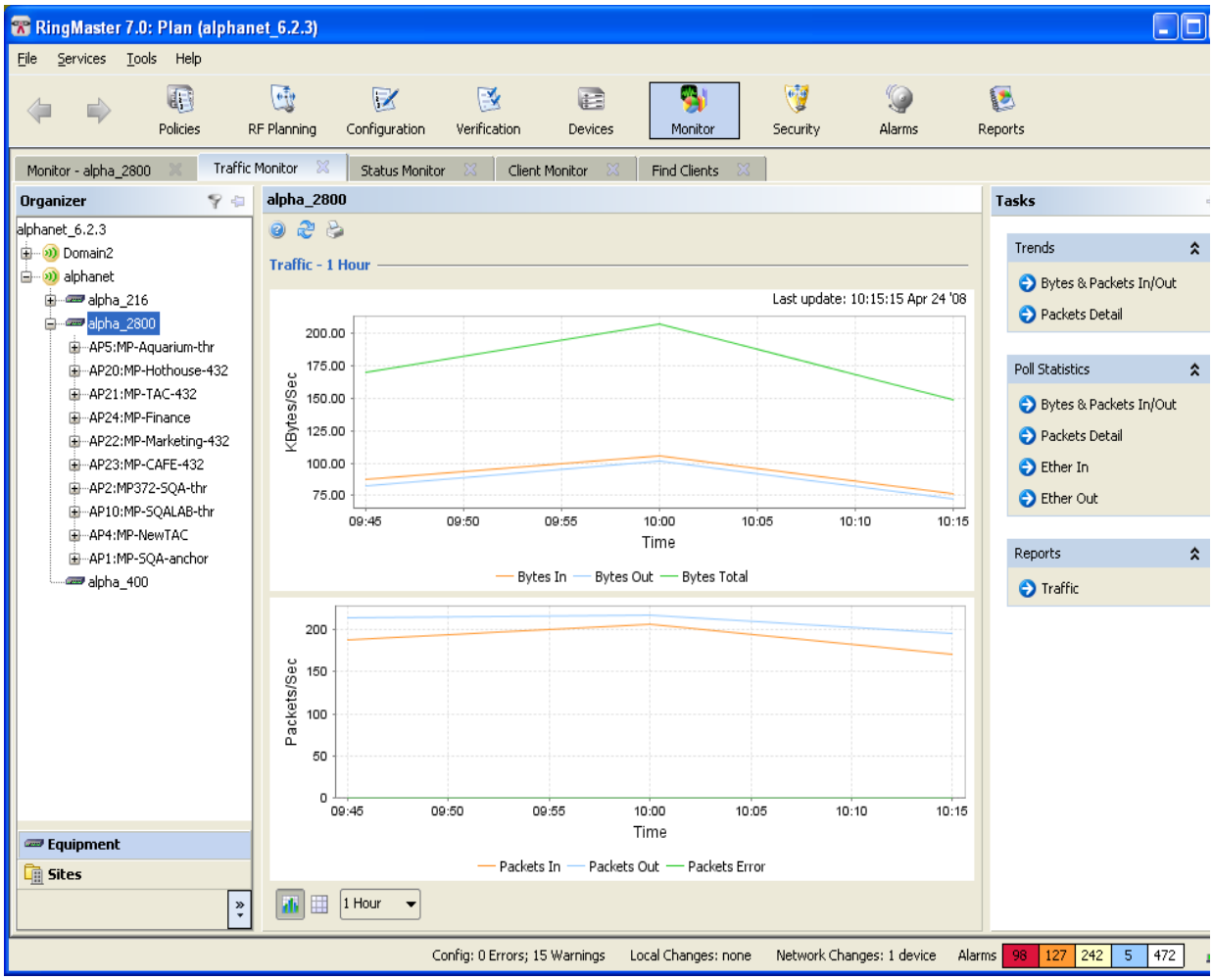
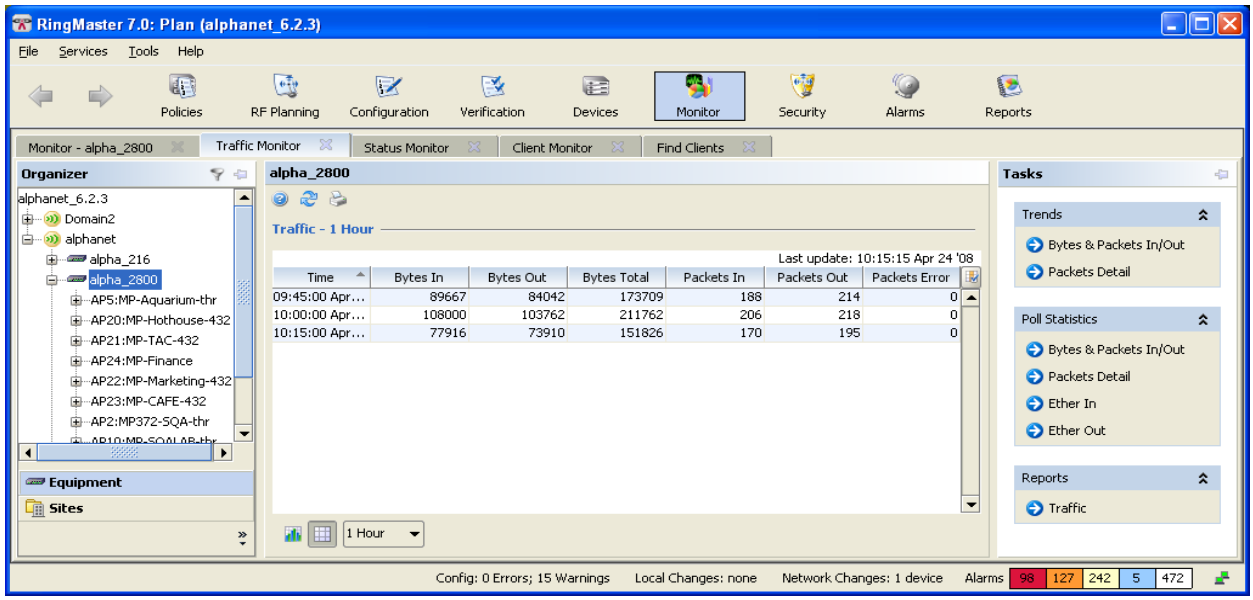
The following screens provide samples of the same information, Traffic - 1 Hour. The first screen shows the information represented using a chart, the second shows the information represented in tabular format.





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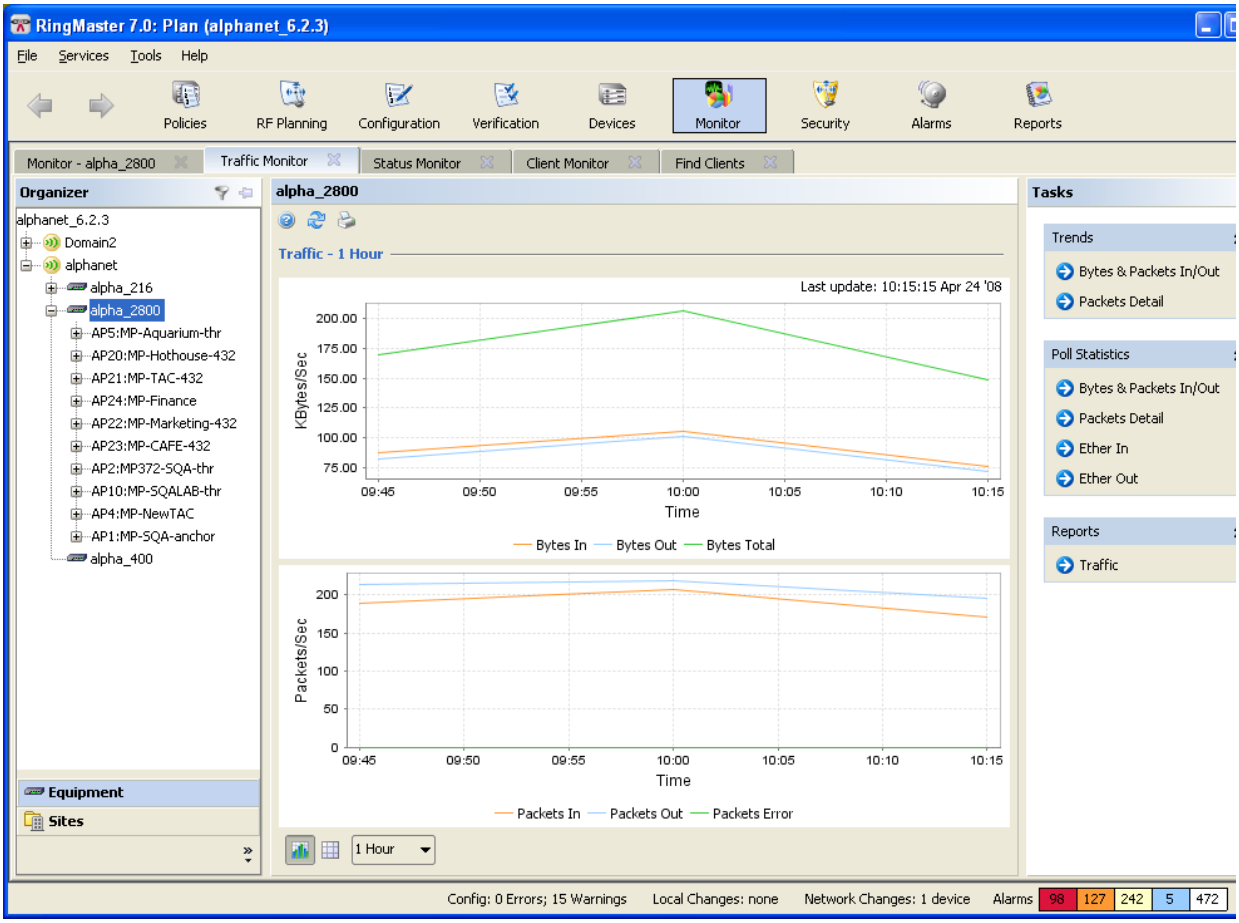
Traffic Details

Click the **Details** button to switch the view from the Traffic Monitor dashboard to the Traffic Details view. The following screen is a sample of the data available for **Traffic - 1 Hour** in **Traffic Monitor** view.



Additional Traffic Options

Additional traffic options are available from the Traffic Monitor dashboard. These options are located on the right side of the screen and include the following:

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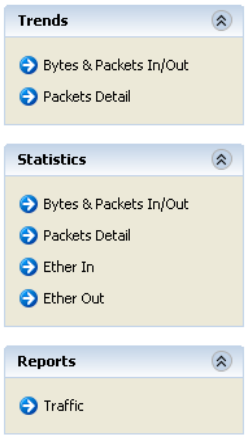

- Trends
  - Bytes & Packets In/Out
  - Packets Detail
- Statistics
  - Bytes & Packets In/Out
  - Packets Detail
  - Ether In
  - Ether Out
- Reports
  - Traffic

Voice Monitoring with Traffic Views

RingMaster includes monitoring functions that help with voice deployments. QoS statistics — including per-queue Tx and Rx counts — can be accessed via the **Traffic Monitor** dashboard, allowing you to perform real-time monitoring of QoS on a specific radio or client.

On-Demand Statistics Monitoring

Each of the Monitor dashboard views offers a way to see on-demand statistics. For example, selecting a session from the Client Monitor panel launches the current statistics for that session.

Viewing Performance Data

RingMaster opens a separate window for the statistics panel, and you can open multiple statistics panels. You can keep the windows separate, or group multiple statistic windows together by dragging them across the windows.

Monitoring Individual Users

If an individual user notifies you that the network is very slow or inaccessible, perform the following steps to identify the problem:

1. Find the user in the list of users on the network.
2. Locate the user on the floor plan. (If you can locate them, then the problem scope can be narrowed to performance.)
3. View the network activity of the user.
4. View network performance statistics for the user session.

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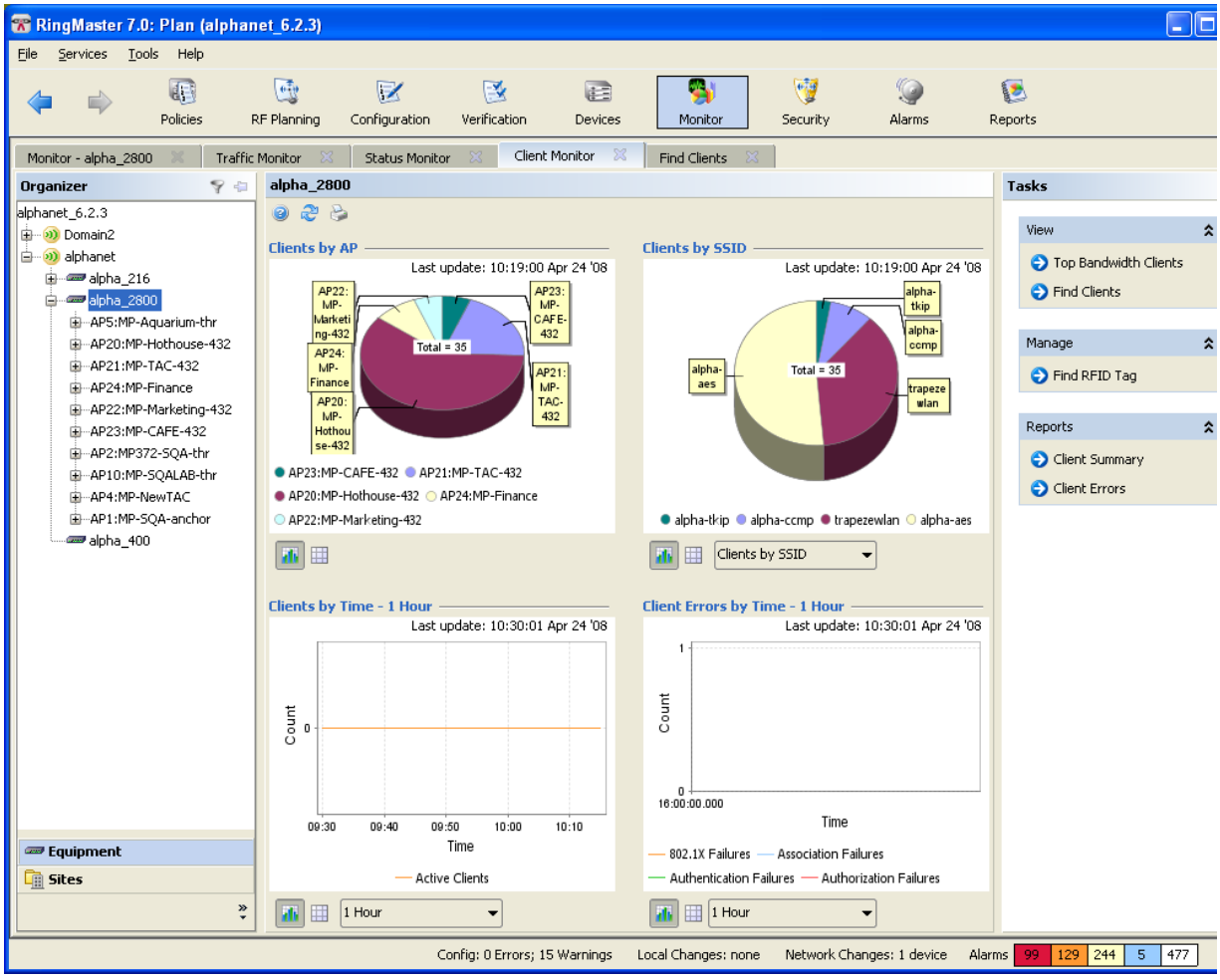
Finding a User

You can find a user or multiple users based on the following criteria:

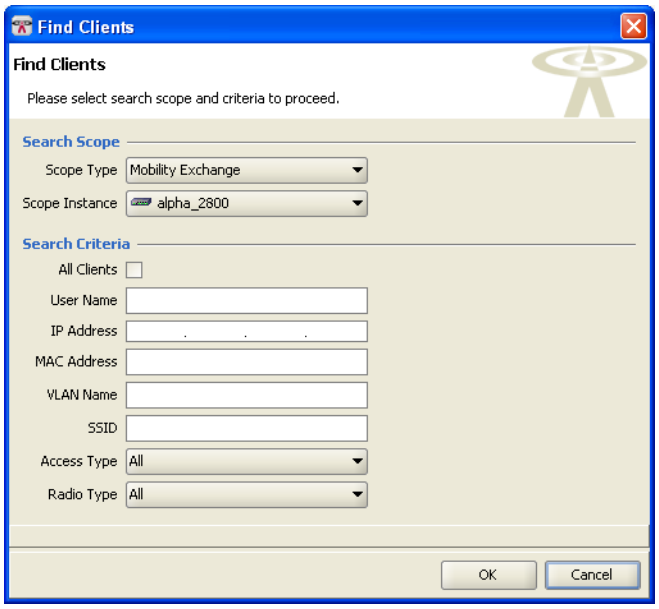
- **Username**
- **IP address**
- **MAC address**
- **VLAN name**

To find a user:

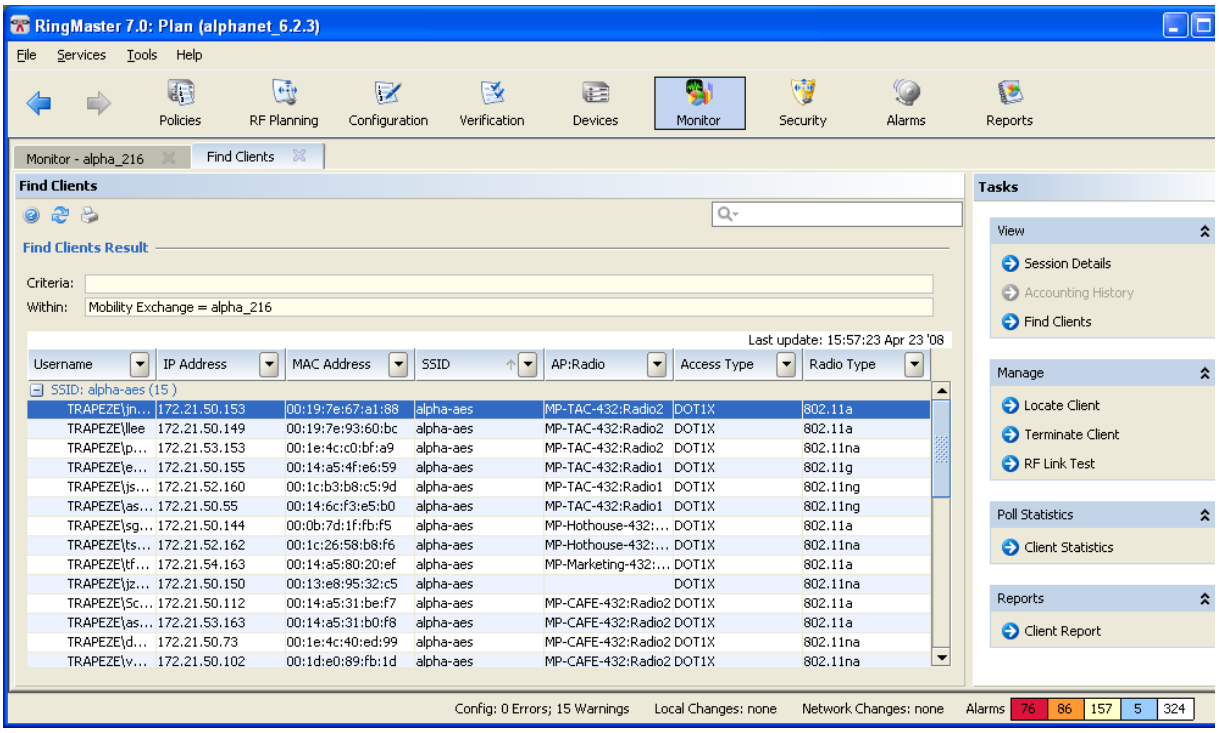
1. Click on the **Monitor** button on the main *RingMaster* Navigation Bar.
2. Click **Details** in the **Client Summary View** to switch to the **Client Monitor View**.



3. Click **Find Clients** under the **Manage** section of the **Tasks** panel. The **Find Clients** dialog box appears, as shown below.



4. Enter the desired search criteria, and search scope. Click **OK**. *RingMaster* displays search results.



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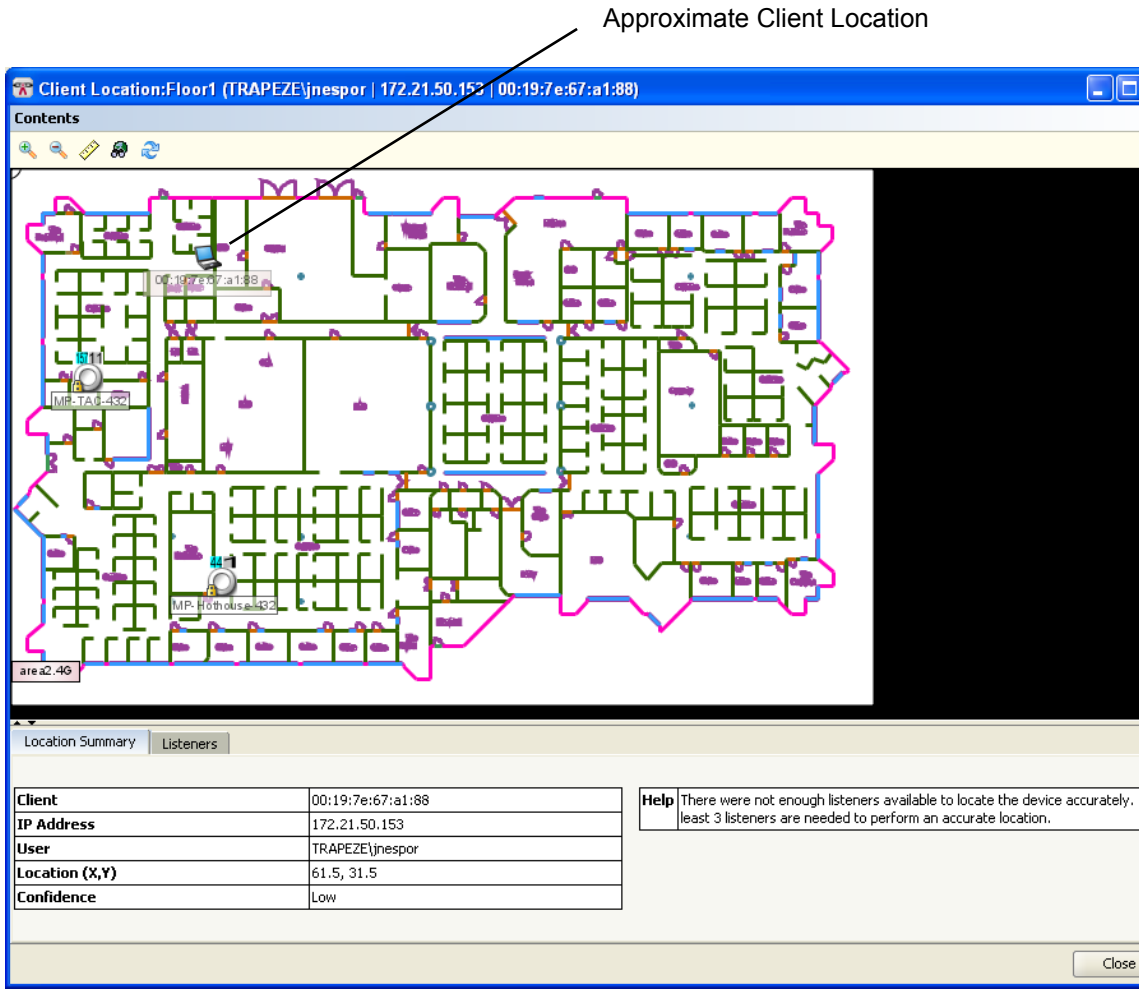
You can display a user's approximate location as follows:

1. On the **Find Clients Result** screen, click **Locate Client** (under **Manage**). *RingMaster* retrieves information about the location.
2. If three or more APs have not detected a client within 15 seconds, the **Listeners Selection** dialog box appears, displaying a list of APs that have detected the client. You can select up to six APs from the list. *RingMaster* uses selected APs to calculate the location of a client.
3. *RingMaster* displays the approximate location of a client on the floor plan. The location of the client is indicated with a laptop icon, as shown below.



4. To refresh the list of APs that detect a client, click the (**Refresh Listeners**) button. To change the APs used for calculating the location of a client, click the **Listeners** tab and select or deselect APs from the list, then click the (**Locate**) button.

Displaying User Activity

You can display event types recorded for a user. Disassociation events can occur, and users dropped from a network. These events can indicate a reason why access is barred or performance is slow for a user. For example, authorization failures occur if a local database or RADIUS server fails to recognize a user.

To display user activity:

1. On the **Find Clients** screen, click the **Session Details** task (under **View**). *RingMaster* retrieves information about a client session.

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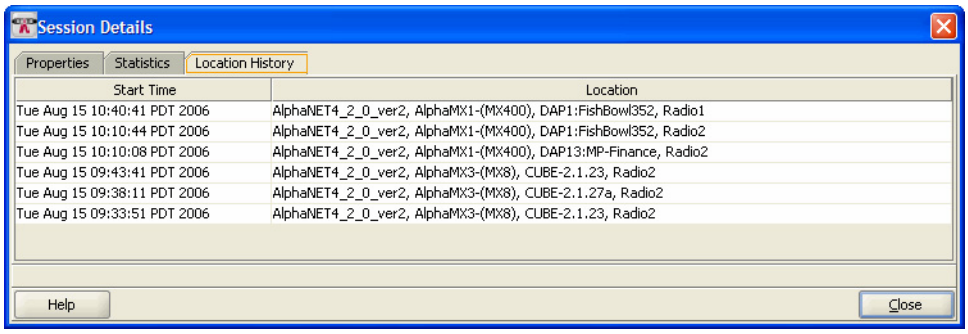
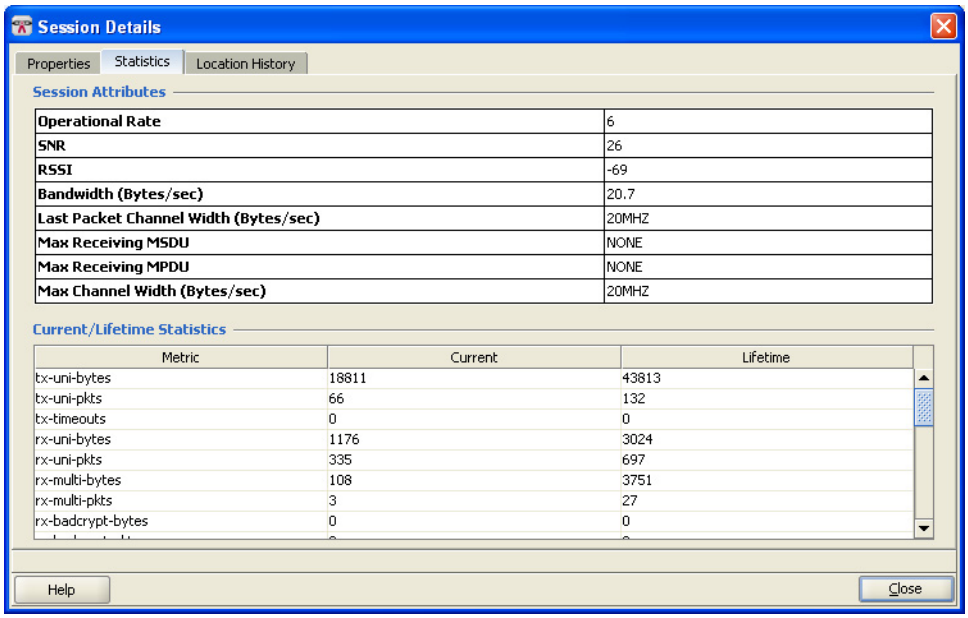
2. Select the **Location History** tab to see where a user has been. From here, you can determine the areas in a WLAN where there is interference.



3. Select the **Statistics** tab to display current and lifetime statistics for the user.



Operational rate statistics display throughput per second.

The following throughput rates are optimum:

- **802.11b** — 11 Mb/s (optimum)
- **802.11g/a** — 36 Mb/s or higher

Signal to Noise Ratio (SNR) statistics can help you determine whether the interference is being created by too much noise on a channel. Receive Signal Strength (RSSI) statistics can indicate whether a low signal strength is creating the user's performance problem. A high number of Transmit Timeouts (tx-timeouts) can indicate interference problems.

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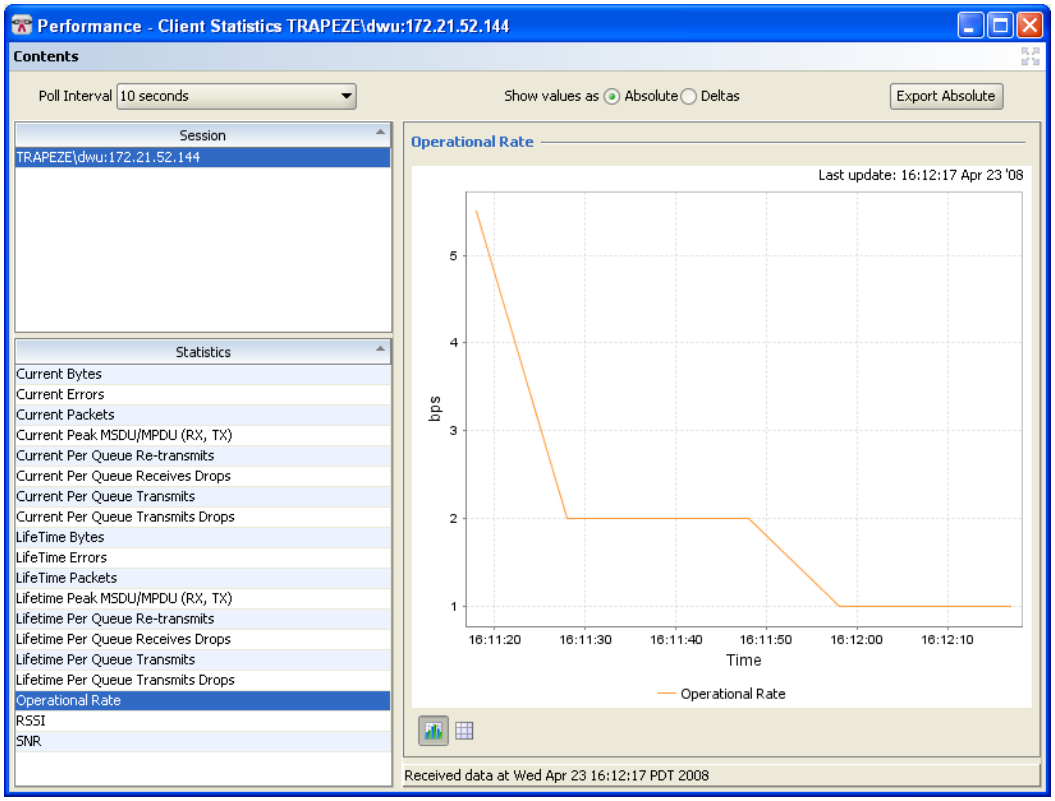
View User Performance Statistics

If an issue cannot be traced to a specific problem based on current activity, you can view statistics over a period of time.

To view user performance statistics:

1. Click on the **Monitor** button on the main *RingMaster* Navigation Bar.
2. Click **Details** in the **Client Summary View** to move to the **Client Monitor View**.
3. In the table of **Client Sessions** in the **Content** panel, select a user session, then click **Client Statistics** in the **Task Panel** to display the **Performance - Client Statistics...** dialog.



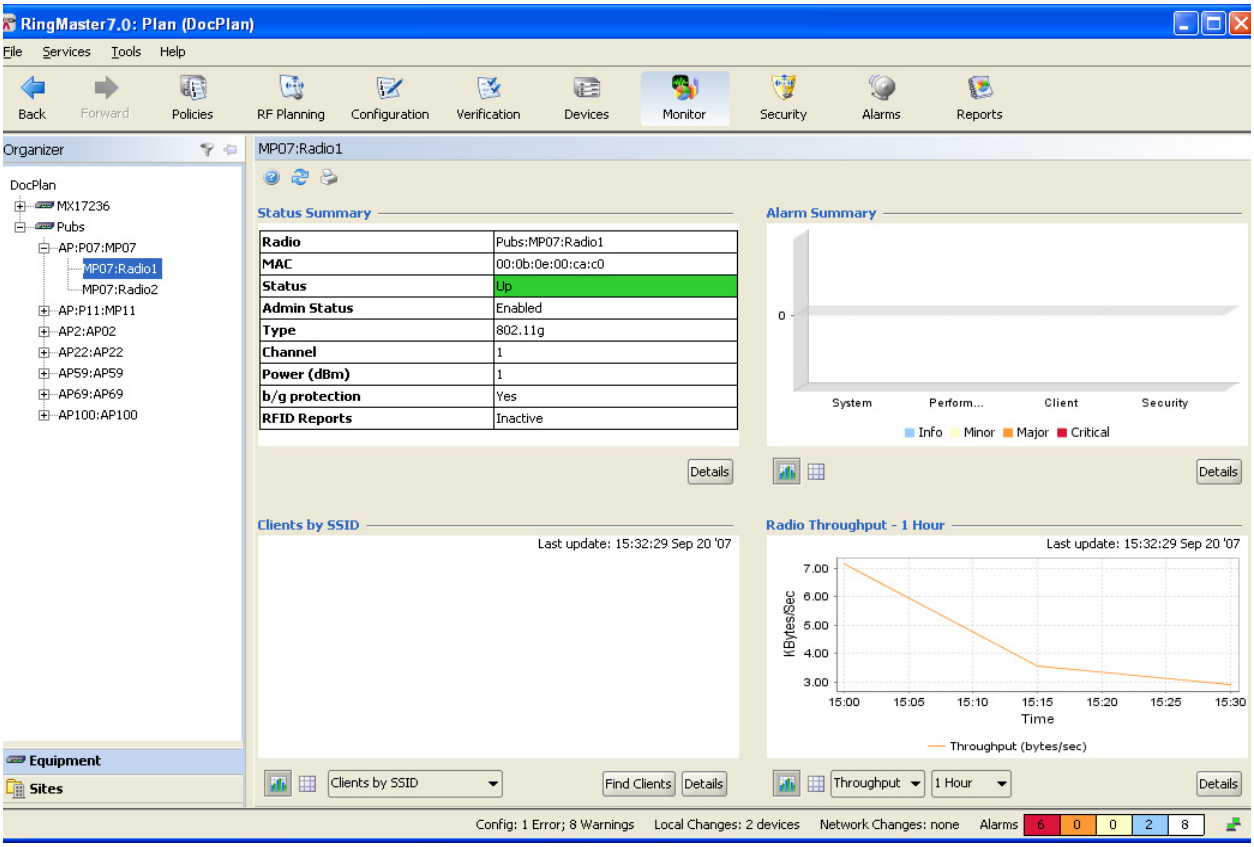
4. From the **Poll Interval** list, you can select how often *RingMaster* collects specified statistics for a user.

Monitoring a Group of Users

If a group of users in a specific area of a floor say they are experiencing poor performance, target a radio or radios those users are associating with and view performance statistics and trends for just those radios.

To view performance statistics for an individual radio:

1. Click on the **Monitor** button on the main *RingMaster* Navigation Bar.
2. Expand the **Equipment** list in the **Organizer** panel, and select a radio. Monitor views display summary information for a selected radio.



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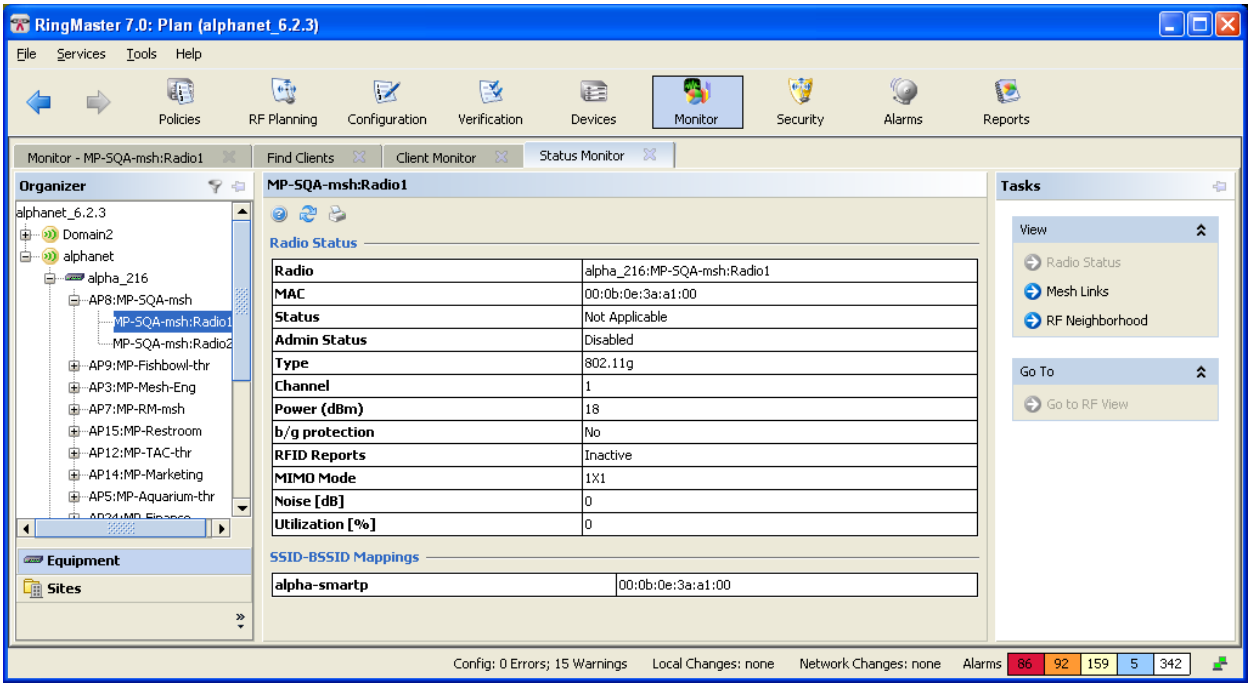
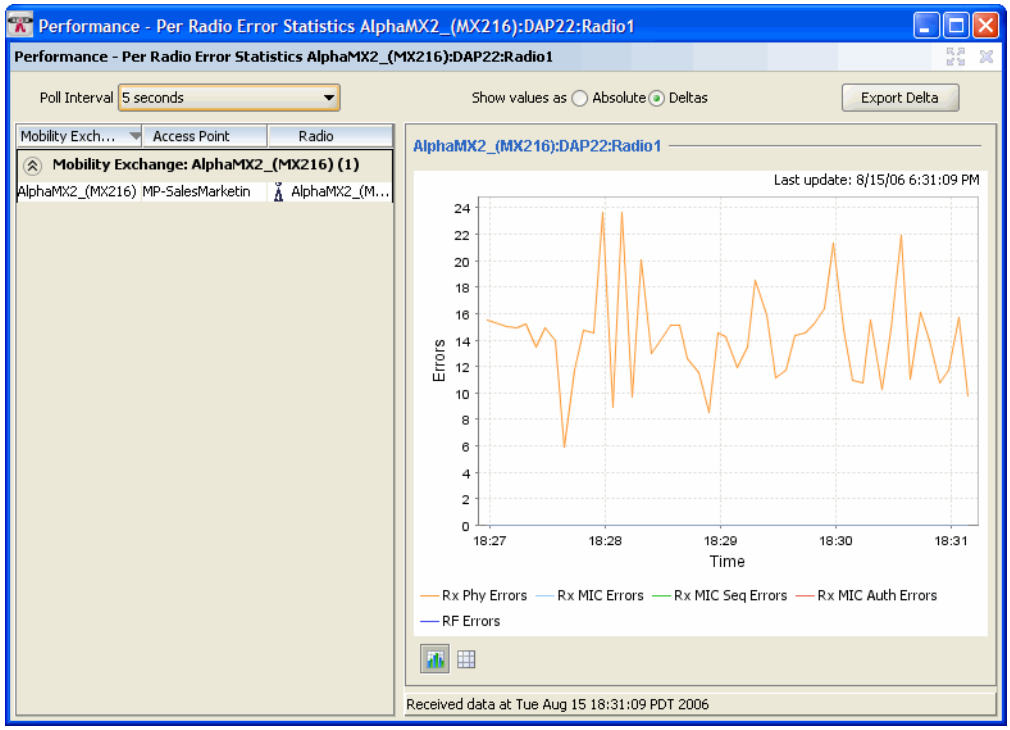
3. Click **Details** in the **Traffic Summary View** to move to a **Radio Status** view.

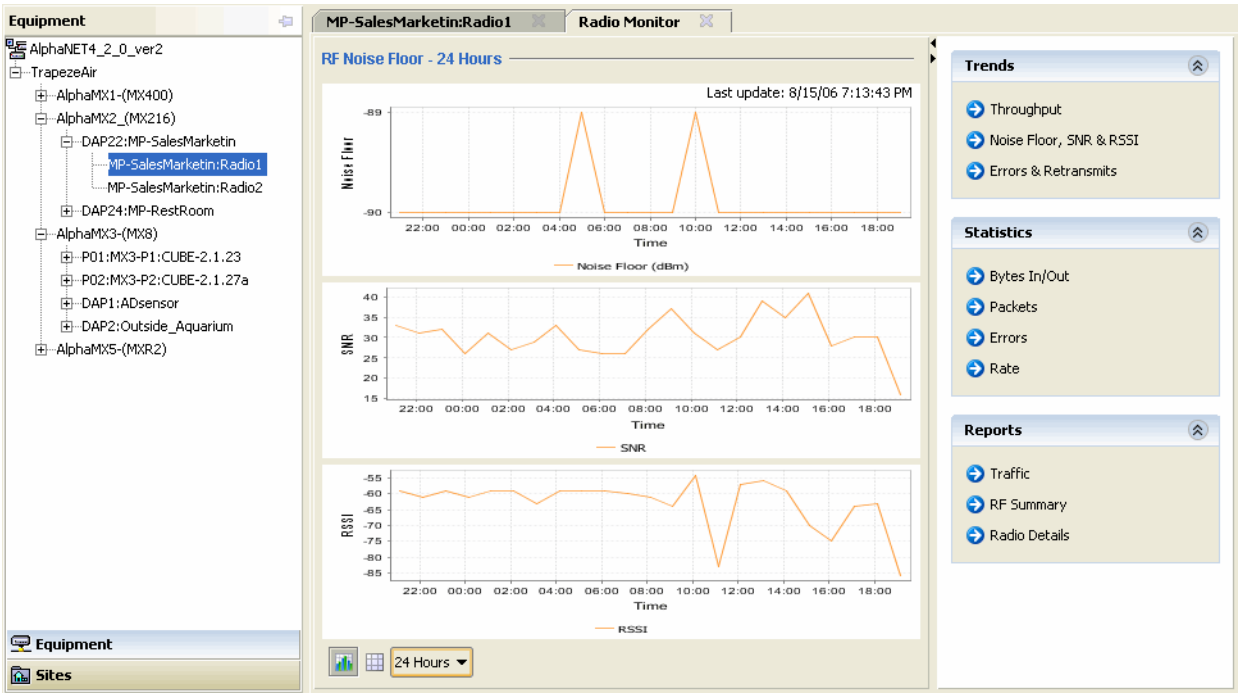


4. Click on an option under **Statistics** in the **Task Panel** to display the **Performance - Per Radio Error Statistics** dialog for a radio. In the example below, error statistics are displayed.



To view RF trends for an individual radio:

1. Click on the **Monitor** button on the main *RingMaster* Navigation Bar.
2. Expand the **Equipment** list in the **Organizer panel**, and select a radio to display the Monitor views for a radio.
3. Click **Details** in the **Traffic Summary View** to switch to the **Radio Monitor View**.
4. Click on one of the options under **Trends** in the **Tasks** panel to display trend information for a radio. Selected trend information is displayed in the **Content** panel. In the example below, trends for Noise Floor, SNR, and RSSI over the past 24 hours are displayed.



Finding an AP on a Floor

Before implementing a wireless network, configure a floor plan that uses RF Planning and Location. You can select an AP access point from the **Monitoring** Equipment tree and display a floor map with that AP selected. From this view, you can generate visualizations of operational statistics such as RSSI, re-transmits, SNR, and signal level to determine problem areas.

To find an AP on the floor:

1. Click on the **Monitor** button in the main *RingMaster* Navigation Bar.
2. Expand the **Site** list in the **Organizer panel** and select the access point to view.
3. *RingMaster* automatically opens the **Floor Viewer** panel displaying a floor map with the selected access point highlighted.
4. Select a statistic from the **Task panel** to generate a topographical visualization of that data. (If you choose the RF Interference, High Utilization, or Coverage Hole options and re-transmit rates within the depicted area that do not exceed 10% of total network bytes, *RingMaster* displays a message dialog instead of generating a visualization.) In the example below, the selected access point is highlighted and RSSI for the coverage area is depicted in the **Floor Viewer**.

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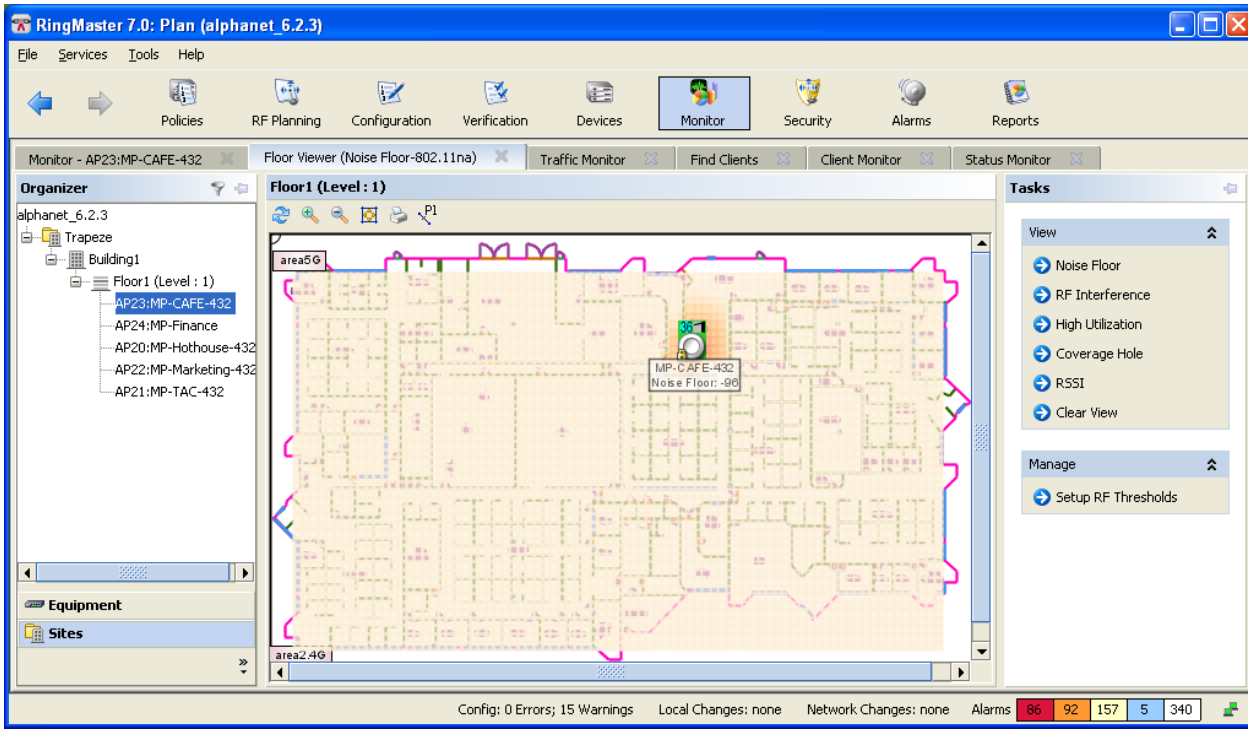

Optimize your network by importing RF measurement data to correct RF attenuation obstacle information if you have a reported coverage area problem or if you want to verify your RF network coverage. For more information about optimizing your network plan, refer to “Optimizing a Network Plan” in the publication *RingMaster Planning Guide*.

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Managing Alarms

Fault Management is a feature included in *RingMaster* to manage faults in a network. A *fault* is reported as an *alarm* generated by a *trap*, *rule*, *status*, or *threshold- exceeded* event. This system monitors traps from Trapeze and OEM devices. It monitors traps from third-party applications and adds new trap support when necessary. The type of traps and their IP sources determine how new traps correlate with existing traps.

Alarm Management

An alarm is generated by a trap, a network verification rule, a status or a threshold exceeded event. There is a one or many to one mapping between faults and the traps/events. Besides monitoring traps from Trapeze and OEM devices, *RingMaster* fault management provides standard traps and traps for third party APs. An interface is provided for adding new trap support. These traps will be correlated based on the type and the source IP only.

In this document, **Fault** and **Alarm** are used interchangeably

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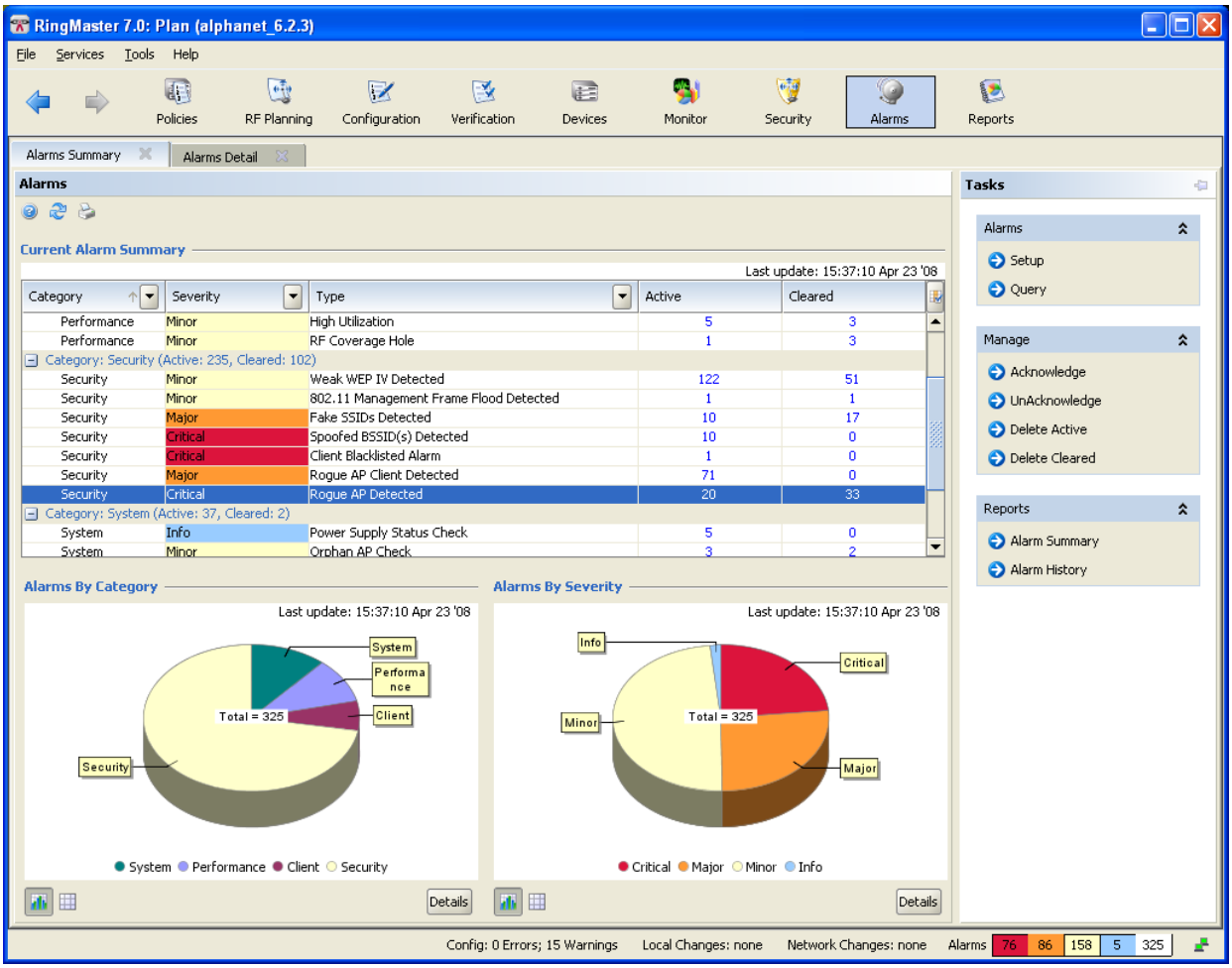
Alarms Summary Window

The **Alarm Summary** view shows alarms organized by category, severity and alarm type.



There are three ways to view **Alarm Summary** details. Like the **Status Summary** table, **blue** numbers are hyperlinks. Click on a hyperlink to view the details for that item. You can also click **Details** to switch from the Alarm Summary view to the Alarm Monitor panel, or select Alarms from the navigation bar. All three selections transfer the view from the Monitor dashboard to the Alarms dashboard. In the Alarms dashboard, you can navigate to a table view for all or specific alarms. For example, clicking on the **Critical** area of the previous graph opens the **Alarms** dashboard view. *RingMaster* filters data so that only critical system alarms are shown.

To get to an alarms detail view, you can click on an alarm category.

The **Alarms Summary** window has the following features:

- A single panel displays all fault related information.
- System allows correlation (periodic or toggle) so that trap events do not always generate a new fault. This reduces the number of faults to be managed.
- Faults are be categorized by different functional areas:
  - Client

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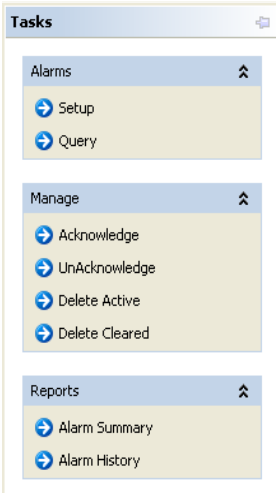
- Performance
- Security
- System

- Faults are assigned one of several severities:
  - Critical (Red)
  - Info (Blue)
  - Major (Orange)
  - Minor (Yellow)
- Source information (MX, *RingMaster*) for a fault is provided.
- For each fault, you are provided information such as cause, fault object and event history.
- Overall status (consolidation of operational status and fault severity) is propagated to the appropriate physical or logical entity in the Monitoring view.
- You can sort faults based on any of the displayed columns. When faults are sorted on time/date of occurrence they are organized as **Today**, **Yesterday**.
- Filtering based on **Category**, **Severity,** and **Type** is available.
- Provides text search capability

In this view, there are **Tasks** panel items including the following:



- View
  - **Setup**
  - **Query**
- Manage
  - **Acknowledge**
  - **Unacknowledge**
  - **Delete Active**
  - **Delete Cleared**
- Reports
  - **Alarm Summary**
  - **Alarm History**

Fault Management

- Each fault has an associated state — active, acknowledged, cleared).
- You can perform tasks such as **Acknowledge**, **UnAcknowledge Delete Active** and **Delete Cleared** to manage faults.
- For some faults, there is a pre-determined task list to guide you on tasks/resolutions that can be performed on a fault.
- If the *RingMaster Server* restarts after being down for a prolonged period of time, say 1 hour, all faults are cleared on restart since we can no longer guarantee if these faults are valid.
- If a fault has already been cleared or acknowledged and a new event occurs which can be correlated to this fault, this fault is made active again
- Whenever the state of a fault is changed — from active to acknowledge etc — the last update time is updated
- You can multi-select faults and perform any fault management operations.
- RFDetect and Status summary subsystems generate relevant events which are displayed as a fault.

Fault Storage and History

- Fault information is stored on the server so multiple clients can access it.
- For each fault, all correlated traps/events are stored.
- Active fault information and fault information history are maintained by the server (in the database)

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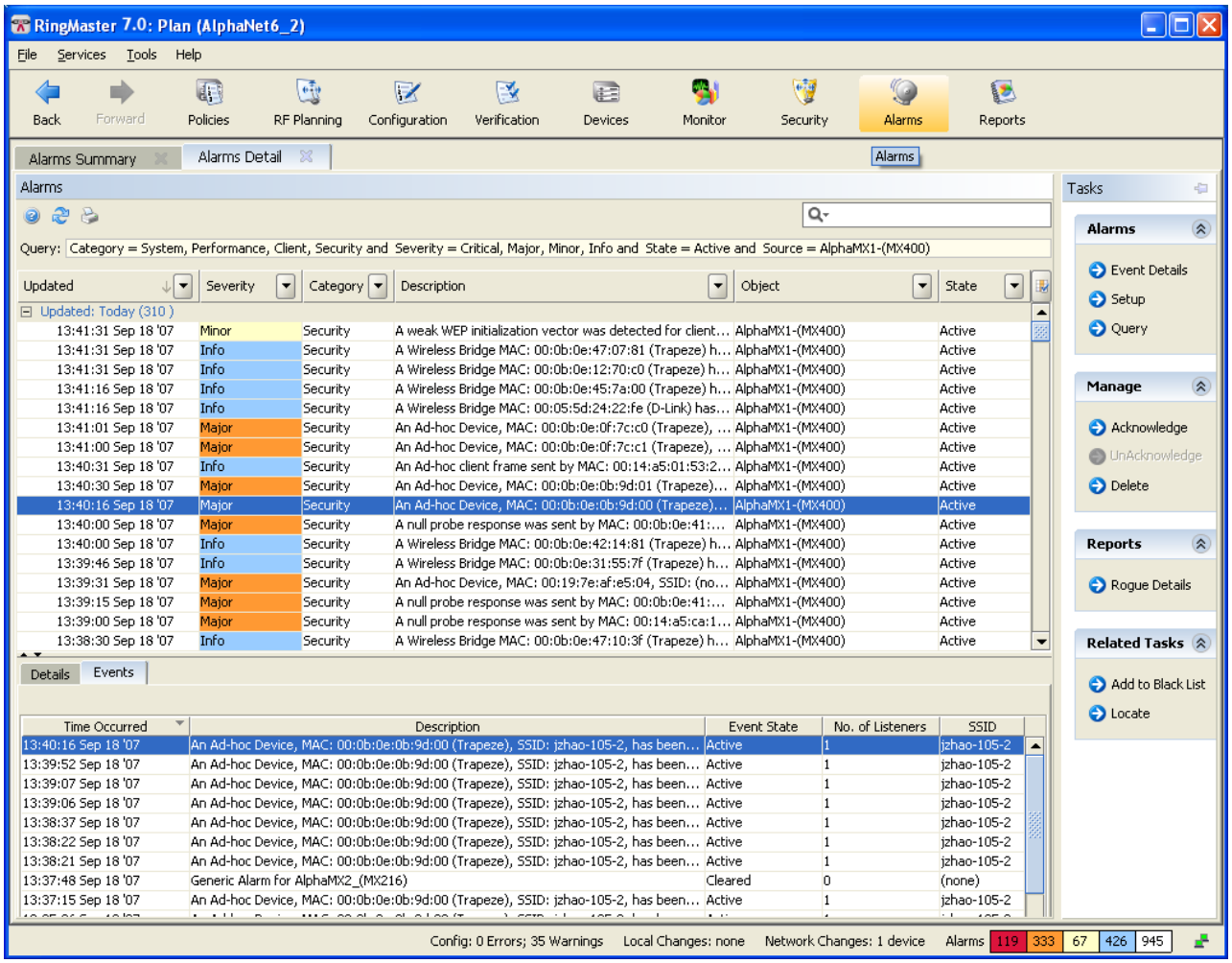
- You can view historic Fault information, if required (on-demand reports).
- Fault database is periodically purged so it does not keep growing. Purging is based on criteria such as the number of active faults (events) or number of days for which data is preserved.

Fault Reporting

- Provides the capability to export fault data (.csv).
- Provides the following reports:
  - Alarm Summary report — Counts of current faults in the system by Category, Severity, Type, Active or Cleared.
  - Alarm History report — This report provides a list of faults in the system over a specified time period. Filter criteria may be Category, Severity or Type.

Alarms Detail Window

If you click on the **Alarms Detail** tab, you see the following window:


RingMaster 7.0: Plan (AlphaNet6_2)
File Services Tools Help
Back Forward Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Alarms Summary Alarms Detail
Alarms
Query: Category = System, Performance, Client, Security and Severity = Critical, Major, Minor, Info and State = Active and Source = AlphaMX1-(MX400)
Updated Severity Category Description Object State
Updated: Today (310)
13:41:31 Sep 18 '07 Minor Security A weak WEP initialization vector was detected for client... AlphaMX1-(MX400) Active
13:41:31 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:47:07:81 (Trapeze) h... AlphaMX1-(MX400) Active
13:41:31 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:12:70:c0 (Trapeze) h... AlphaMX1-(MX400) Active
13:41:16 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:45:7a:00 (Trapeze) h... AlphaMX1-(MX400) Active
13:41:16 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:05:5d:24:22:fe (D-Link) has... AlphaMX1-(MX400) Active
13:41:01 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0f:7c:c0 (Trapeze), ... AlphaMX1-(MX400) Active
13:41:00 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0f:7c:c1 (Trapeze), ... AlphaMX1-(MX400) Active
13:40:31 Sep 18 '07 Info Security An Ad-hoc client frame sent by MAC: 00:14:a5:01:53:2... AlphaMX1-(MX400) Active
13:40:30 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:01 (Trapeze)... AlphaMX1-(MX400) Active
13:40:16 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze)... AlphaMX1-(MX400) Active
13:40:00 Sep 18 '07 Major Security A null probe response was sent by MAC: 00:0b:0e:41:... AlphaMX1-(MX400) Active
13:40:00 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:42:14:81 (Trapeze) h... AlphaMX1-(MX400) Active
13:39:46 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:31:55:7f (Trapeze) h... AlphaMX1-(MX400) Active
13:39:31 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:19:7e:af:e5:04, SSID: (no... AlphaMX1-(MX400) Active
13:39:15 Sep 18 '07 Major Security A null probe response was sent by MAC: 00:0b:0e:41:... AlphaMX1-(MX400) Active
13:39:00 Sep 18 '07 Major Security A null probe response was sent by MAC: 00:14:a5:ca:1... AlphaMX1-(MX400) Active
13:38:30 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:47:10:3f (Trapeze) h... AlphaMX1-(MX400) Active
Details Events
Time Occurred Description Event State No. of Listeners SSID
13:40:16 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:39:52 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:39:07 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:39:06 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:38:37 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:38:22 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:38:21 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:37:48 Sep 18 '07 Generic Alarm for AlphaMX2_(MX216) Cleared 0 (none)
13:37:15 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
Tasks
Alarms
Event Details
Setup
Query
Manage
Acknowledge
UnAcknowledge
Delete
Reports
Rogue Details
Related Tasks
Add to Black List
Locate
Config: 0 Errors; 35 Warnings
Local Changes: none
Network Changes: 1 device
Alarms 119 333 67 426 945

In this view, there are **Tasks** panel items including the following:

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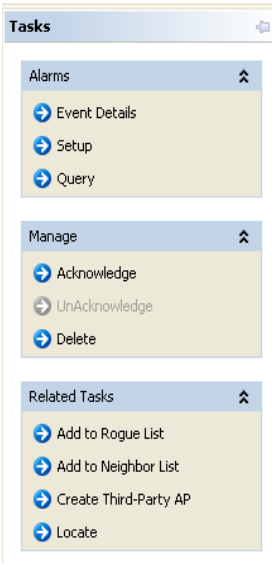
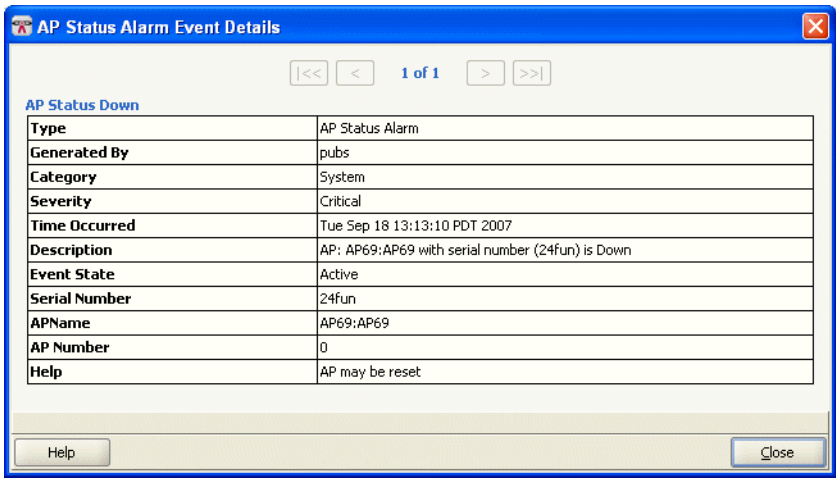


- Alarms
  - **Event Details**
  - **Setup**
  - **Query**
- Manage
  - **Acknowledge**
  - **Unacknowledge**
  - **Delete**
- Reports
  - **Add to Rogue List**
  - **Add to Neighbor List**
  - **Create Third-Party AP**
  - **Locate**

You can select individual alarms and click **Event Details** in the **Tasks** panel to see more detail:



LA-200E Alarms Displayed by RingMaster

If you choose to integrate the LA-200E with RingMaster to manage your network management software the following LA-200E alarms are displayed in the **Alarms** panel of RingMaster:

- **AP Snoop Status**
- **Agent Status**
- **Asset Tag Button Pressed**
- **Asset Tag Battery Low**
- **Asset Tag Detached**

Setting Up the Fault Management System

Setting up of the Fault Management system is done by users, service administrators, provisioning users, and monitoring users, including performing the following tasks:

- Customize faults — for example: assign severity to faults and set up e-mail notifications.
- Enable or disable faults based on their category or severity.
- Modify fault settings in the Fault Management System — Service administrators only.
- Manage faults and invoke resolutions, if available — Provisioning users.
- View faults and acknowledge or disregard the faults — Monitoring users.

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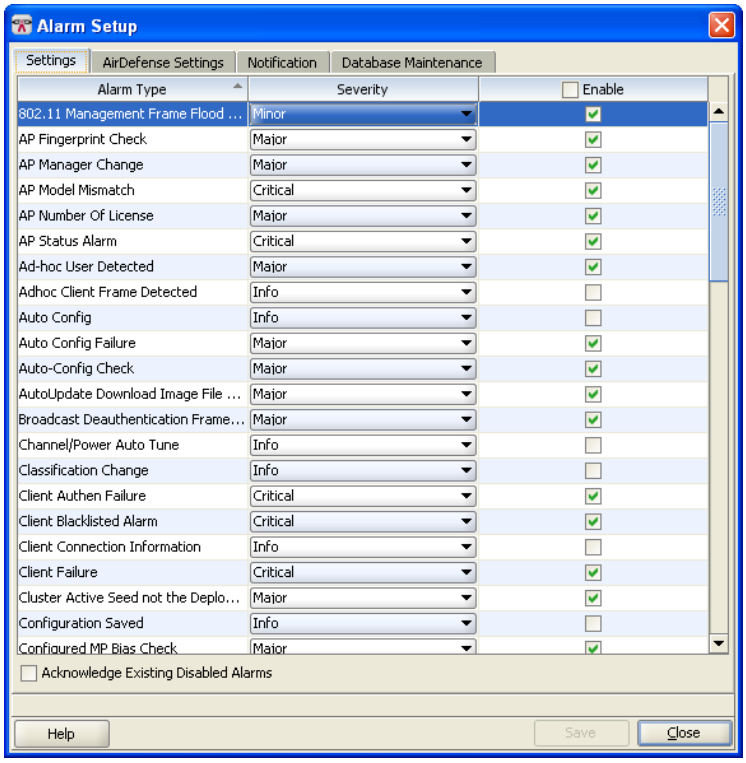
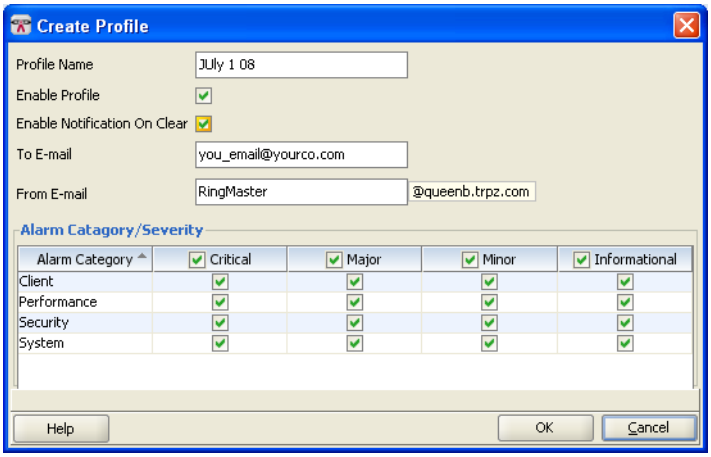
To set up the Fault Management System:

1. Select the **Alarms** button on the main *RingMaster* Navigation Bar.
2. Click **Setup** in the **Task Panel**. The **Alarm Setup** dialog is displayed.



3. Select the type of alarms to enable by selecting the appropriate check box. Notice that there are several types available for various severity levels.
4. Click the **Notification** tab, click on **Create** and set an alarm **Profile Name**, enable it by clicking the **Enable Alarm Notification** checkbox, enter an e-mail address where you wish to receive alerts, and use check boxes to indicate the severity levels for which *RingMaster* sends an e-mail notification.



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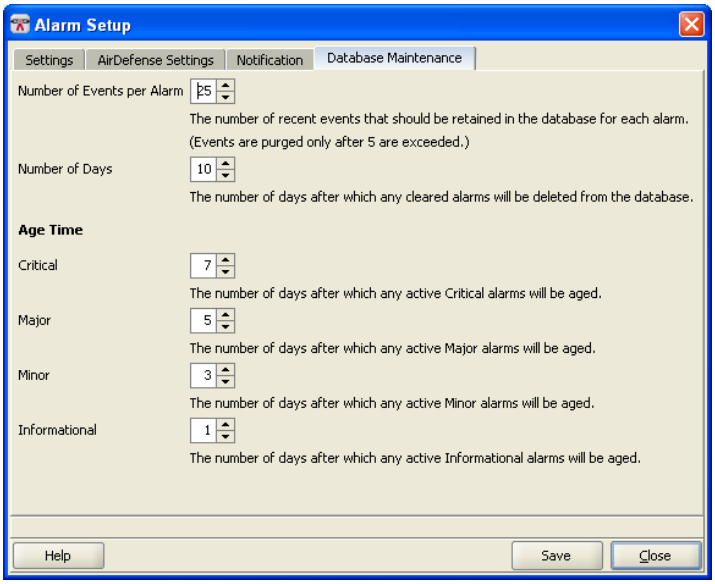
You can select severity levels for the following categories:

- **Critical**
- **Major**
- **Minor**
- **Informational**

5. Click the **Database Maintenance** tab. The **Database Maintenance** tab allows you to specify how many faults to store in a database how many days to keep uncleared faults. In addition, this tab is used to specify the number of days to keep active Critical, Major, Minor, and Informational alarms in the database.


Alarm Setup
Settings
AirDefense Settings
Notification
Database Maintenance
Number of Events per Alarm
25
The number of recent events that should be retained in the database for each alarm.
(Events are purged only after 5 are exceeded.)
Number of Days
10
The number of days after which any cleared alarms will be deleted from the database.
Age Time
Critical
7
The number of days after which any active Critical alarms will be aged.
Major
5
The number of days after which any active Major alarms will be aged.
Minor
3
The number of days after which any active Minor alarms will be aged.
Informational
1
The number of days after which any active Informational alarms will be aged.
Help
Save
Close

Enter the desired values in the following fields as follows:

- **Number of events per alarm** — The number of recent events that should be retained in the database for each alarm.
- **Number of days** — The number of days after which any cleared alarms are deleted from the database.

Age Time section:

- **Critical** — The number of days after which any active Critical alarms will be aged.
- **Major** — The number of days after which any active Major alarms will be aged.
- **Minor** — The number of days after which any active Minor alarms will be aged.
- **Informational** — The number of days after which any active Informational alarms will be aged.

6. Click **Save** to save your changes, then **Close** to close the dialog.

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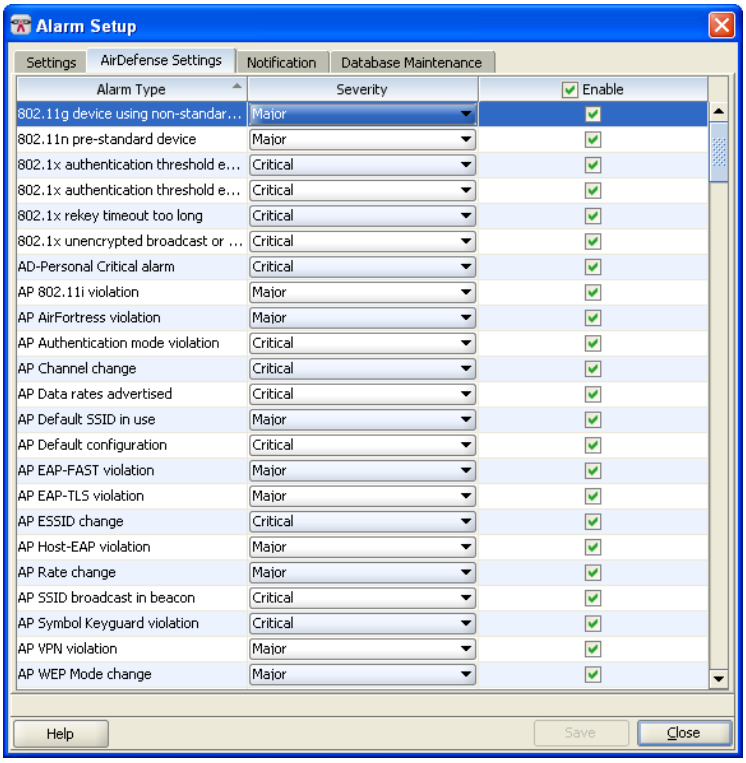
7. Click on the **AirDefense Settings** tab and set **AirDefense** settings as appropriate. Click **Save** and then **Close**.



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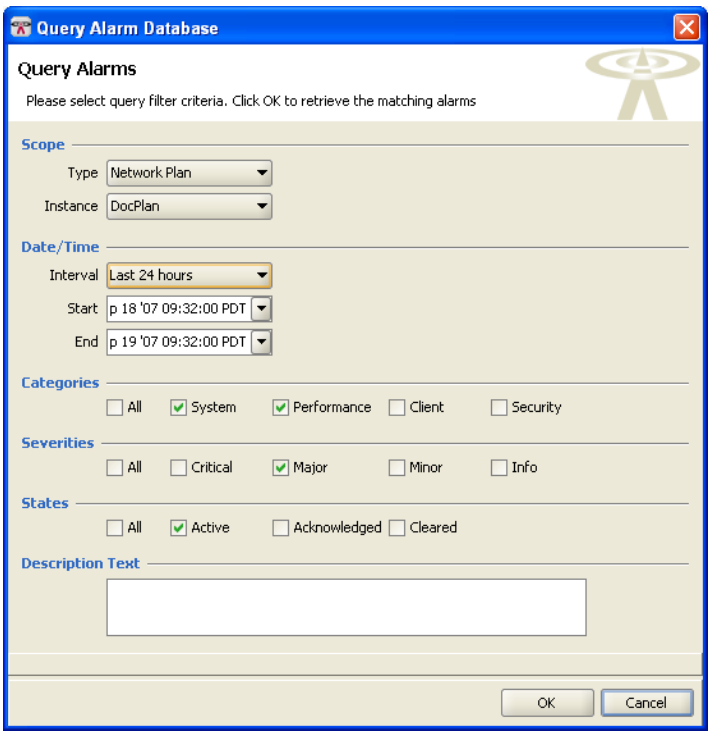
Alarms Database Query

RingMaster can filter alarms based on any of the columns in the table. *RingMaster* sorts faults based on a **Scope, Date/Time, Categories, Severities, States** and/or **Description Text** you indicate by selecting an alarm and clicking **Query** in the **Tasks** panel.



Storing Faults and Retrieving Fault History

RingMaster stores fault information in a server database and allows multiple clients to access this data. With each fault stored in the database, correlated traps and events are stored. Data is periodically purged to keep the database a manageable size. Purging is based on criteria such as the number of active faults (events) or the number of days for which data should be preserved.

In addition to active fault information, this database holds historic fault information. You can view this information when necessary. However, it is available for viewing in reports only. You cannot perform any action on historic information.

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Detecting Rogue Devices

AP radios automatically scan the RF spectrum for other devices transmitting in the same spectrum. RF scans discover third-party transmitters in addition to other Trapeze radios. MSS considers non-Trapeze transmitters to be *devices of interest*, which are potential rogues. You can display information about potential rogues. To identify friendly devices, such as non-Trapeze access points in your or a neighbor's network, you can add them to the known devices list. You can enable countermeasures to prevent clients from using devices that are true rogues. With *RingMaster*, you also can display the physical location of a rogue device.

Rogue Detection Requirements

Rogue detection in *RingMaster* has the following requirements:

- The **Enable Rogue Detection** option must be selected on the **Monitoring Settings** section of the *RingMaster Services* **Setup** page. (Refer to **Monitoring Settings**.)
- To use countermeasures, they must be enabled. You can enable them on an individual radio profile basis. (See "Viewing and Configuring Radio Profiles" in the publication *RingMaster Configuration Guide*.)
- SNMP notifications must be enabled on the MXs. **Table 1– 1** lists the notification types related to RF detection. The notification types for Intrusion Detection System (IDS) and Denial of Service (DoS) protection are also listed. (To enable notifications on a switch, see "Configuring SNMP" in the publication *RingMaster Configuration Guide*.)

Table 1– 1. SNMP Notifications for RF Detection

Notification Type	Description
RogueDetect	MSS has detected a rogue AP.
RFDetectRogueDisappear	MSS is no longer detecting a previously detected rogue AP.
RFDetectInterferingRogueAP	MSS has detected an interfering device.
RFDetectInterferingRogueDisappear	MSS is no longer detecting a previously detected interfering device.
RFDetectAdHocUser	MSS has detected an ad-hoc user.
RFDetectUnAuthorizedSSID	MSS has detected an SSID that is not on the permitted SSID list. (See **Rogue Detection Lists**.)
RFDetectUnAuthorizedOUI	MSS has detected a wireless device that is not on the list of permitted vendors. (See **Rogue Detection Lists**.)
RFDetectUnAuthorizedAP	MSS has detected the MAC address of an AP that is on the attack list. (See **Rogue Detection Lists**.)
IDS/DoS notifications	For more information about IDS/DoS, see the "IDS and DoS Alerts" section in the "Rogue Detection and Countermeasures" chapter of the *Trapeze Mobility System Software Configuration Guide.*
CounterMeasureStart	MSS has begun countermeasures against a rogue AP.
CounterMeasureStop	MSS has stopped countermeasures against a rogue access point.
RFDetectSpoofedMacAP	MSS has detected a wireless packet with the source MAC address of a Trapeze AP, but without the AP's spoofed signature (fingerprint).

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Table 1– 1. SNMP Notifications for RF Detection (continued)

Notification Type	Description
RFDetectSpoofedSSIDAP	MSS has detected beacon frames for a valid SSID, but sent by a rogue AP.
RFDetectDoS	MSS has detected a DoS attack other than an associate request flood, reassociate request flood, or disassociate request flood.
RFDetectDoSPort	MSS has detected an associate request flood, reassociate request flood, or disassociate request flood.
RFDetectClientViaRogueWiredAP	MSS has detected, on the wired part of the network, the MAC address of a wireless client associated with a third-party AP.

Mobility Domain Requirement

RF Detection requires a Mobility Domain to be available. If no Mobility Domain is operational — not all members are up — no new RF Detection data is processed. Existing RF Detection information ages normally. Processing of RF Detection data is resumed when all members of a Mobility Domain are up. If a seed MX in a Mobility Domain cannot resume full operation, you can restore the Mobility Domain to full operation, and therefore resume RF Detection data processing, by removing inoperative MXs from the member list on the seed.

Rogue Detection Lists

Rogue detection lists specify third-party devices and SSIDs that MSS allows on a network, and devices MSS classifies as rogues.

You can configure the following rogue detection lists:

- **Permitted SSID list** — A list of SSIDs allowed in the Mobility Domain. MSS generates a message if an SSID not on the list is detected.
- **Permitted vendor list** — A list of the wireless networking equipment vendors whose equipment is allowed on the network. *RingMaster* identifies the vendor using the Organizationally Unique Identifier (OUI) The OUI is the first three bytes of the MAC address of the equipment. MSS generates a message if an AP or wireless client with an OUI that is not on the list is detected.
- **Rogue list** — A list of AP MAC addresses to attack whenever they are present on the network.
- **Client black list** — A list of MAC addresses of wireless clients who are not allowed on the network. MSS prevents clients on the list from accessing the network through an MX. If the client is placed on the black list dynamically by MSS due to an association, reassociation or disassociation flood, MSS generates a log message.
- **Ignore list** — A list of third-party devices that you want to exempt from rogue detection. MSS does not count devices on the ignore list as rogues or interfering devices, and does not issue countermeasures against them.

An empty permitted SSID list or permitted vendor list implicitly allows all SSIDs and vendors. When you add an entry to the SSID or vendor list, SSIDs or vendors not in the list are disallowed. An empty client black list allows all clients, and an empty ignore list considers all third-party wireless devices to be potential rogues. All lists except the black list require manual configuration. You can configure entries in the black list, and MSS can place a client in the black list, due to an association, reassociation, or disassociation flood from a client.

The rogue classification algorithm examines each of these lists when determining if a device is a rogue. **Figure 1–1** shows how the rogue detection algorithm uses lists.

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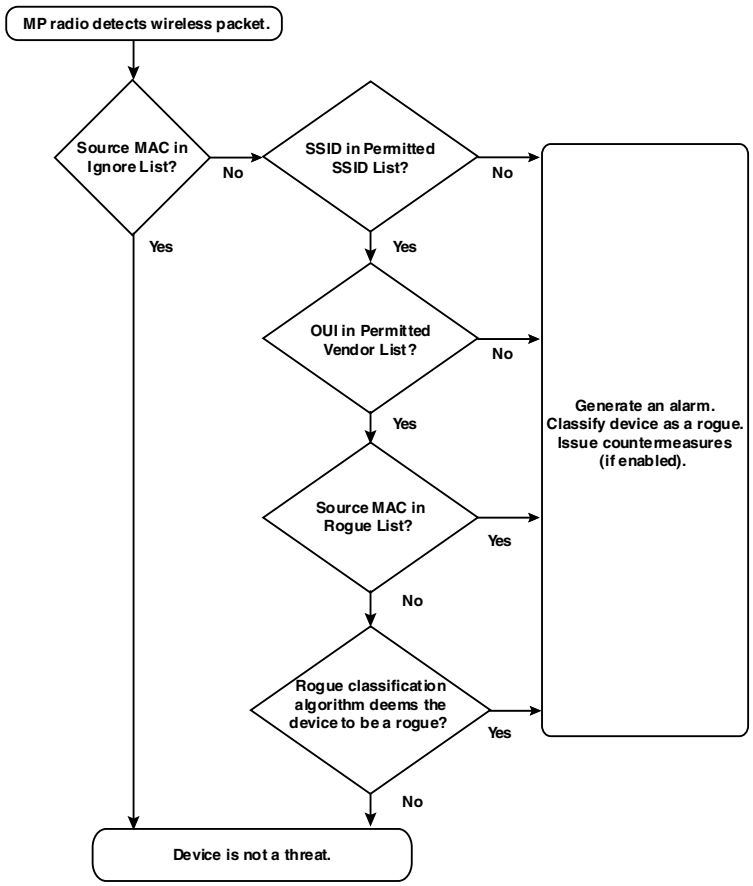
Figure 1–1. Rogue Detection Algorithm



Using Fault Management to Locate a Rogue

This section provides an example of how you can use the Fault Management system to locate rogue devices on your network, then configure MSS to use countermeasures against them. AP radios automatically scan the RF spectrum for other devices transmitting in the same spectrum. The RF scans discover third-party transmitters in addition to other Trapeze radios. MSS considers the non-Trapeze transmitters to be devices of interest, which are potential rogues.

A rogue access point is an unauthorized access point on your network. Rogue access points and their clients undermine the security of an enterprise network by potentially allowing unchallenged access to the network by any wireless user or client in the physical vicinity. Rogue access points and users can also interfere with the operation of your enterprise network. You can configure *RingMaster* to automatically use countermeasures against rogue APs to disable them.

Not all access points placed on the rogue list are “hostile” rogues. You may want to move some of the access points from the rogue list to a known devices list or a third-party AP list. For more information about this topic as well as more detailed information about combatting rogues, see the chapter “Detecting and Combatting Rogue Devices” in the *Trapeze RingMaster Reference Manual.*

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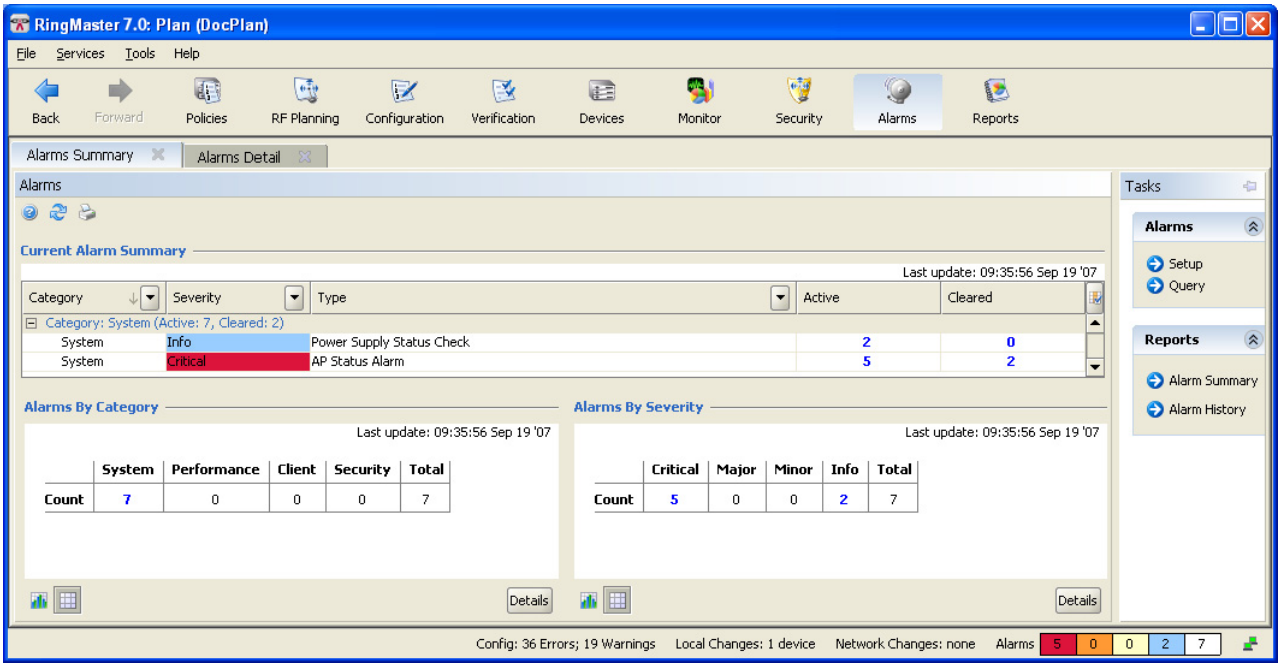
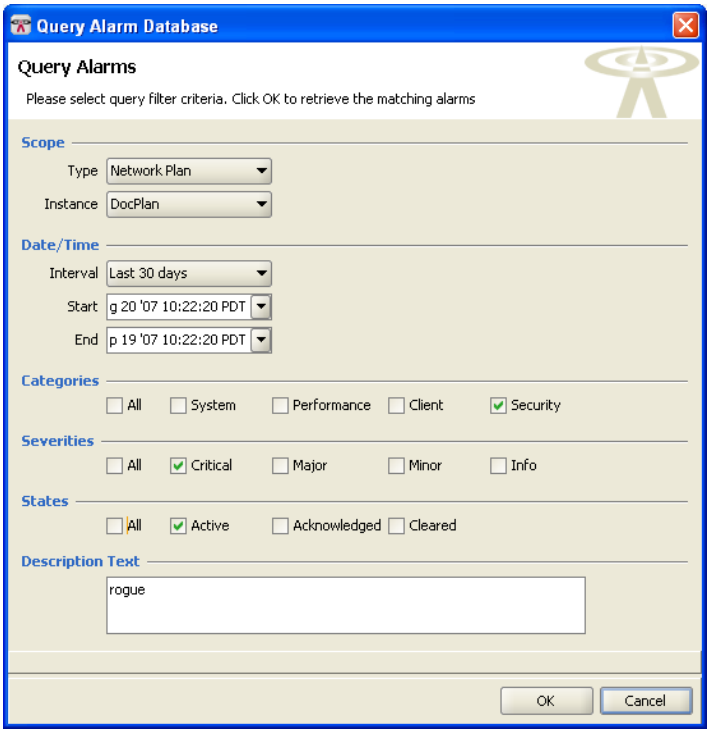
To locate a rogue

1. Click on the **Alarms** button on the main *RingMaster* Navigation Bar. An **Alarms Summary** is displayed.



2. Click on **Query** and select options including “rogue” in the description field in the dialog that appears.



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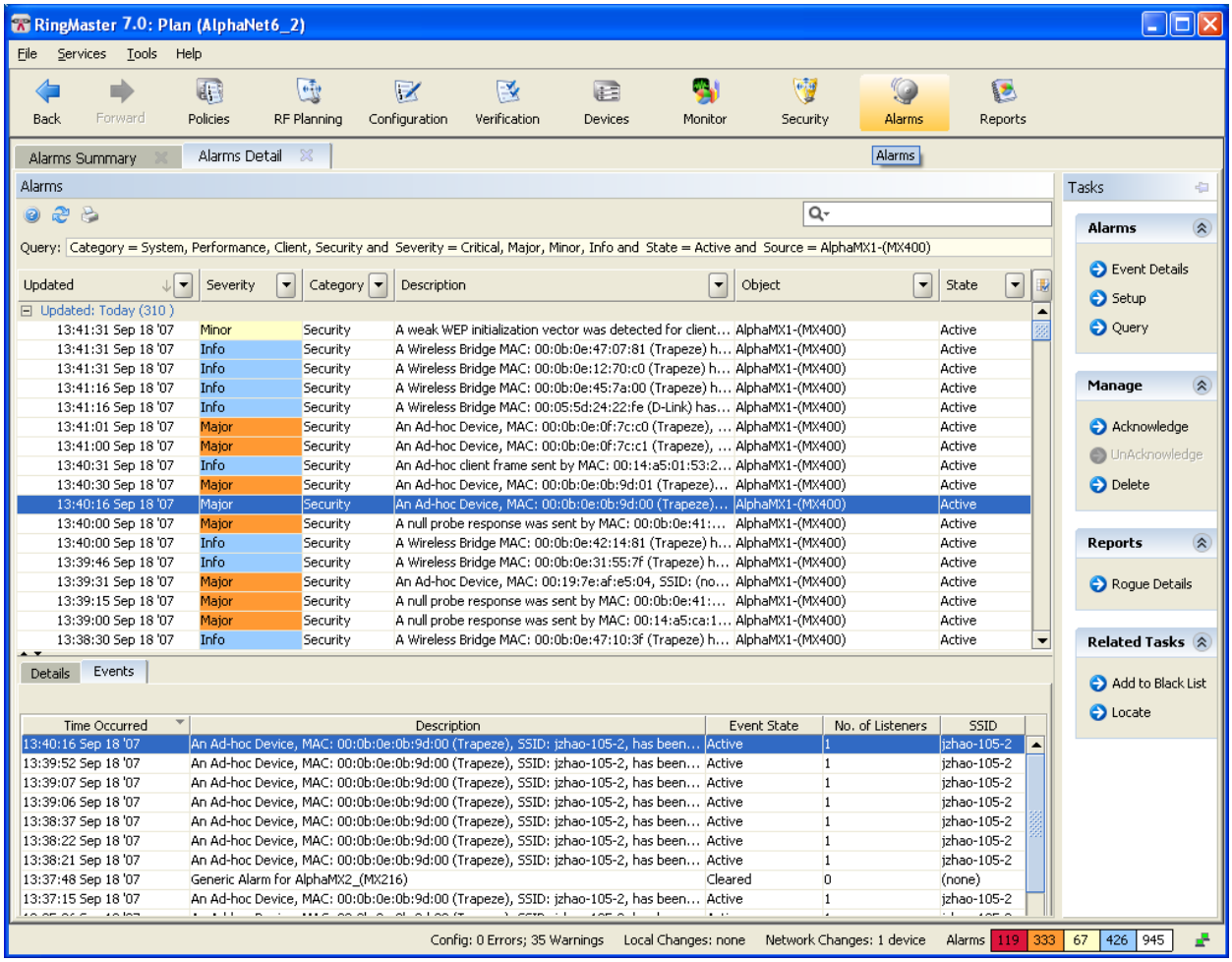
Select **OK** and you will see a list of rogues reported, or a rapid indication of none being found.

3. You can also click on one of the alarms in the **Alarms Detail** list to display details about it.


RingMaster 7.0: Plan (AlphaNet6_2)
File Services Tools Help
Back Forward Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Alarms Summary
Alarms Detail
Alarms
Query: Category = System, Performance, Client, Security and Severity = Critical, Major, Minor, Info and State = Active and Source = AlphaMX1-(MX400)
Updated Severity Category Description Object State
Updated: Today (310)
13:41:31 Sep 18 '07 Minor Security A weak WEP initialization vector was detected for client... AlphaMX1-(MX400) Active
13:41:31 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:47:07:81 (Trapeze) h... AlphaMX1-(MX400) Active
13:41:31 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:12:70:c0 (Trapeze) h... AlphaMX1-(MX400) Active
13:41:16 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:45:7a:00 (Trapeze) h... AlphaMX1-(MX400) Active
13:41:16 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:05:5d:24:22:fe (D-Link) has... AlphaMX1-(MX400) Active
13:41:01 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0f:7c:c0 (Trapeze), ... AlphaMX1-(MX400) Active
13:41:00 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0f:7c:c1 (Trapeze), ... AlphaMX1-(MX400) Active
13:40:31 Sep 18 '07 Info Security An Ad-hoc client frame sent by MAC: 00:14:a5:01:53:2... AlphaMX1-(MX400) Active
13:40:30 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:01 (Trapeze)... AlphaMX1-(MX400) Active
13:40:16 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze)... AlphaMX1-(MX400) Active
13:40:00 Sep 18 '07 Major Security A null probe response was sent by MAC: 00:0b:0e:41:... AlphaMX1-(MX400) Active
13:40:00 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:42:14:81 (Trapeze) h... AlphaMX1-(MX400) Active
13:39:46 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:31:55:7f (Trapeze) h... AlphaMX1-(MX400) Active
13:39:31 Sep 18 '07 Major Security An Ad-hoc Device, MAC: 00:19:7e:af:e5:04, SSID: (no... AlphaMX1-(MX400) Active
13:39:15 Sep 18 '07 Major Security A null probe response was sent by MAC: 00:0b:0e:41:... AlphaMX1-(MX400) Active
13:39:00 Sep 18 '07 Major Security A null probe response was sent by MAC: 00:14:a5:ca:1... AlphaMX1-(MX400) Active
13:38:30 Sep 18 '07 Info Security A Wireless Bridge MAC: 00:0b:0e:47:10:3f (Trapeze) h... AlphaMX1-(MX400) Active
Details Events
Time Occurred Description Event State No. of Listeners SSID
13:40:16 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:39:52 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:39:07 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:39:06 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:38:37 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:38:22 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:38:21 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
13:37:48 Sep 18 '07 Generic Alarm for AlphaMX2_(MX216) Cleared 0 (none)
13:37:15 Sep 18 '07 An Ad-hoc Device, MAC: 00:0b:0e:0b:9d:00 (Trapeze), SSID: jzhao-105-2, has been... Active 1 jzhao-105-2
Tasks
Alarms
Event Details
Setup
Query
Manage
Acknowledge
UnAcknowledge
Delete
Reports
Rogue Details
Related Tasks
Add to Black List
Locate
Config: 0 Errors; 35 Warnings
Local Changes: none
Network Changes: 1 device
Alarms 119 333 67 426 945

4. Click the **Event Details** tab to display events *RingMaster* has recorded about the rogue. The number of listeners (other APs) that detected the rogue are displayed. The larger the number of listeners detecting the rogue, the easier it is for *RingMaster* to locate the rogue in the RF coverage area.
5. You can locate the rogue in the RF coverage area. In the **Tasks** panel, under **Related Tasks**, click **Locate**.

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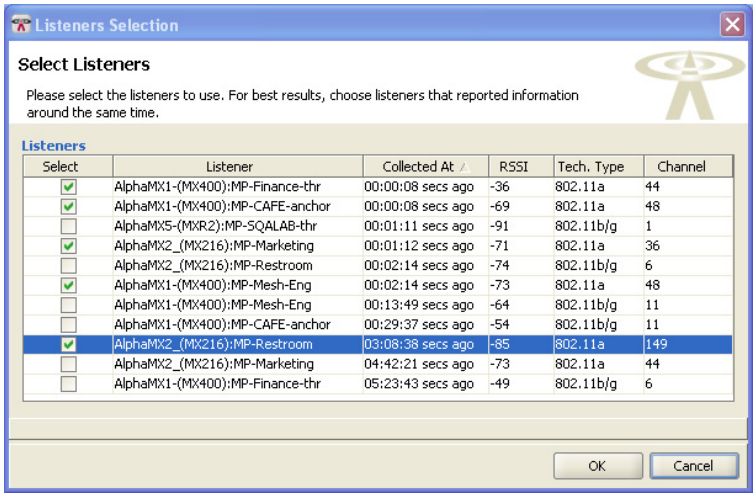
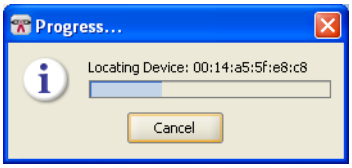
6. You will see a Select Listeners dialog that allows you to select which listeners to use in this location effort. Make selections, then click **OK**.


Listeners Selection
Select Listeners
Please select the listeners to use. For best results, choose listeners that reported information around the same time.
Listeners
Select
Listener
Collected At
RSSI
Tech. Type
Channel
AlphaMX1-(MX400):MP-Finance-thr 00:00:08 secs ago -36 802.11a 44
AlphaMX1-(MX400):MP-CAFE-anchor 00:00:08 secs ago -69 802.11a 48
AlphaMX5-(MXR2):MP-SQALAB-thr 00:01:11 secs ago -91 802.11b/g 1
AlphaMX2_(MX216):MP-Marketing 00:01:12 secs ago -71 802.11a 36
AlphaMX2_(MX216):MP-Restroom 00:02:14 secs ago -74 802.11b/g 6
AlphaMX1-(MX400):MP-Mesh-Eng 00:02:14 secs ago -73 802.11a 48
AlphaMX1-(MX400):MP-Mesh-Eng 00:13:49 secs ago -64 802.11b/g 11
AlphaMX1-(MX400):MP-CAFE-anchor 00:29:37 secs ago -54 802.11b/g 11
AlphaMX2_(MX216):MP-Restroom 03:08:38 secs ago -85 802.11a 149
AlphaMX2_(MX216):MP-Marketing 04:42:21 secs ago -73 802.11a 44
AlphaMX1-(MX400):MP-Finance-thr 05:23:43 secs ago -49 802.11b/g 6
OK
Cancel

7. You will see a Progress dialog.



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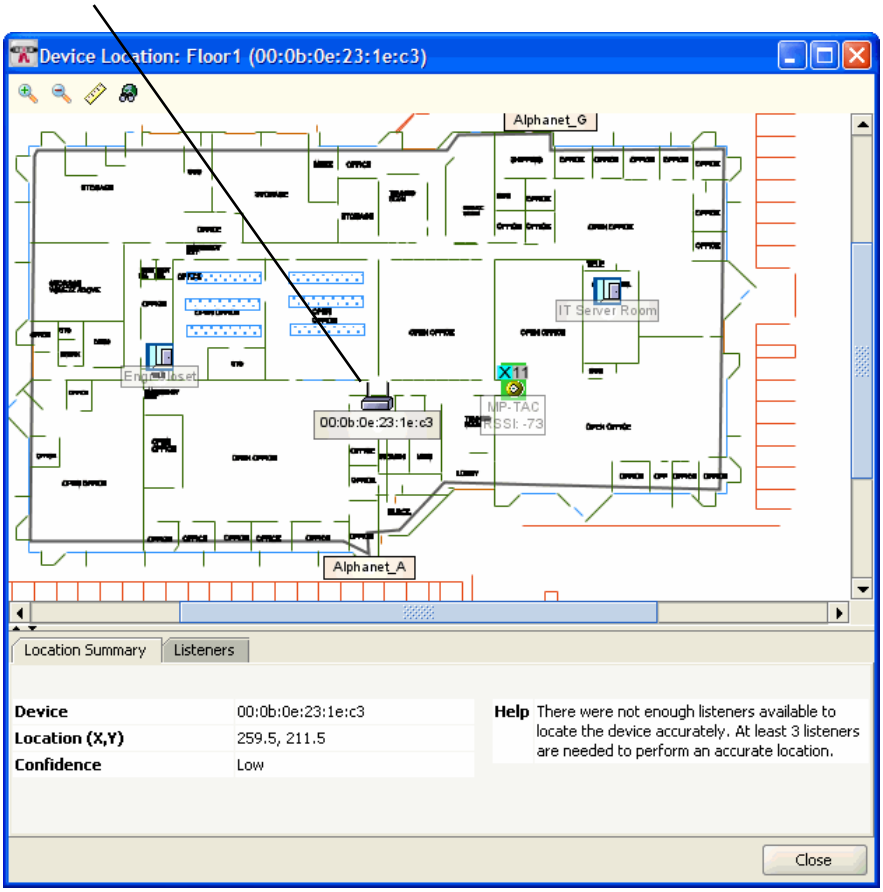
The approximate location of a rogue is displayed in the RF coverage area.

Approximate Rogue Location



8. To change the APs used for calculating the location of the rogue, click the **Listeners** tab and select or deselect APs from the list, then click the (Locate) button.

To enable countermeasures agains rogues, refer to “Configuring Countermeasures” in the publication *RingMaster Configuration Guide*.

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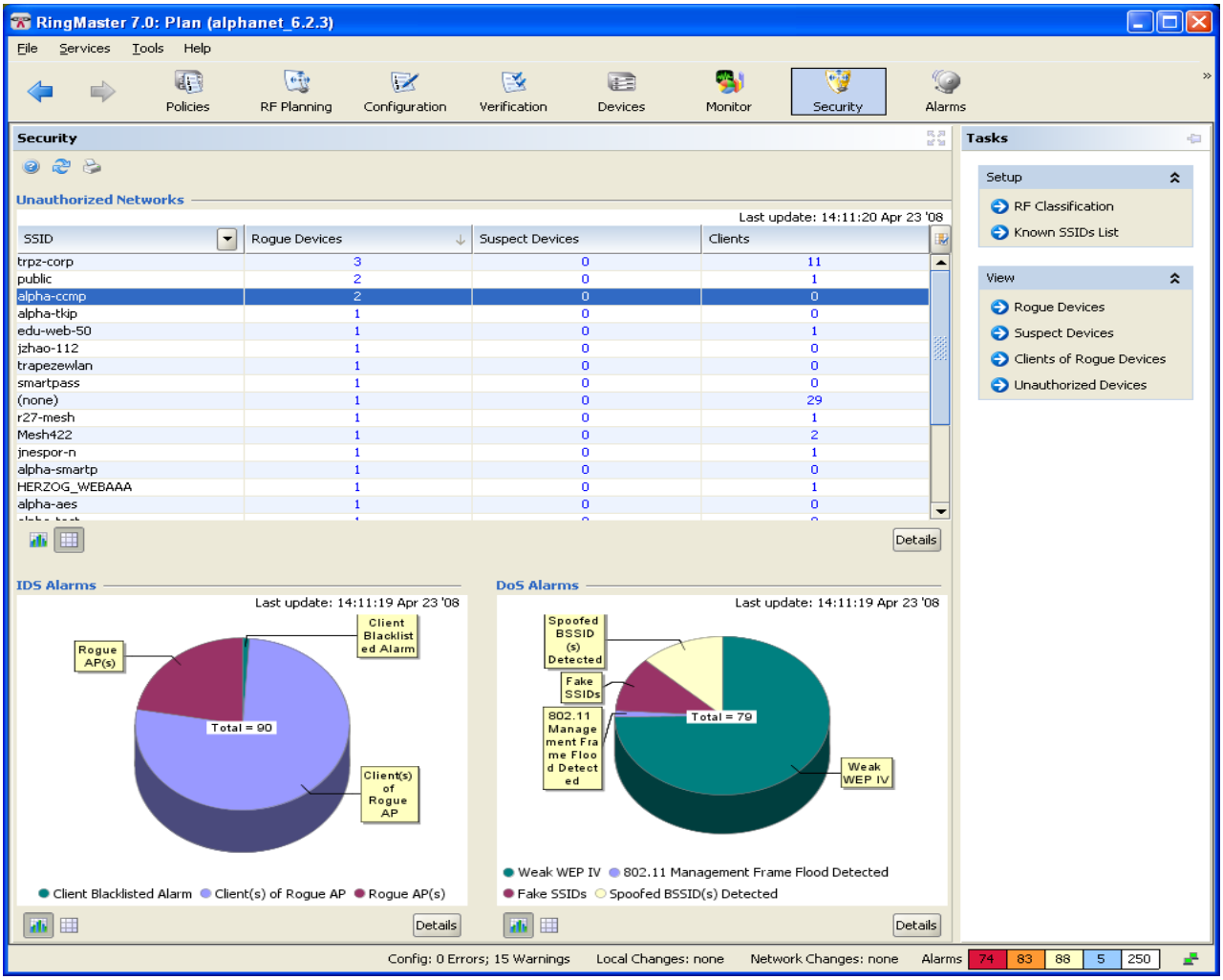
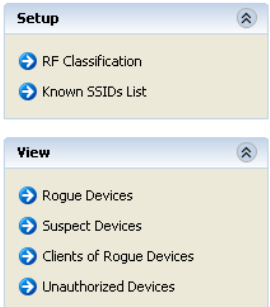
Security Button

There is a **Security** button on the main window that allows you to both **Setup** and **View** items related to **Unauthorized Networks**, **IDS Alarms** and **DoS Alarms**. Wen you click the **Security** button on the main *RingMaster* window, you see the following security information in the **Content** panel.



In this view, there are **Tasks** panel items including the following:



- Setup
  - **RF Classification**
  - **Known SSIDs List**
- View
  - **Rogue Devices**
  - **Suspect Devices**
  - **Clients of Rogue Devices**
  - **Unauthorized Devices**

Each of these is discussed in detail in the next few sections of this guide.

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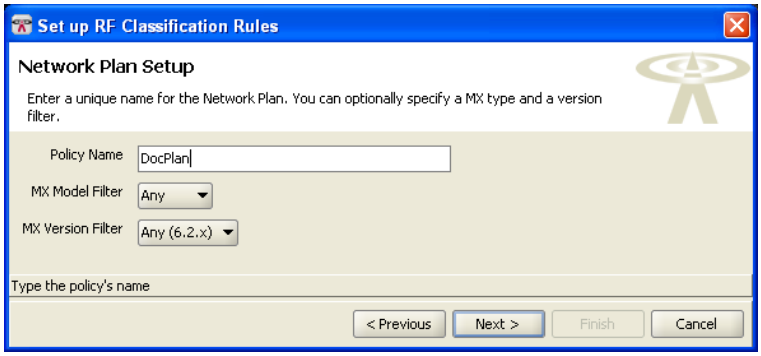
RF Classification

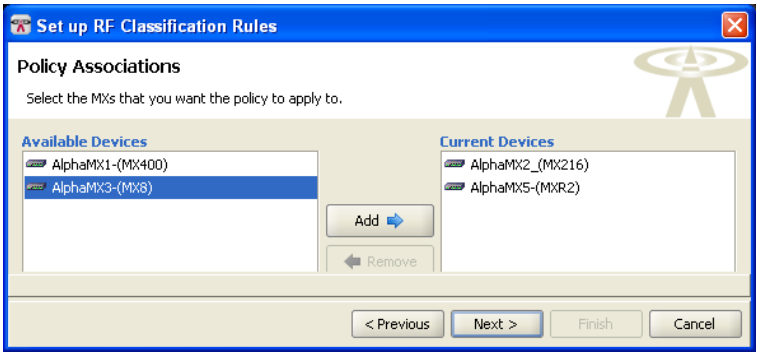
If you click **RF Classification**, you see the following dialog:

Set up RF Classification Rules
Set up RF Classification scope
Select an existing policy or a device or create a new policy and modify its RF Classification rules
Create a new policy and set up its RF classification rules
Select a device and set up its RF classification rules
Select an existing policy and set up it's RF classification rules
< Previous
Next >
Finish
Cancel

1. You can select checkboxes to create policies and control devices n which rules are to be applied.
2. If you select **Create a new policy...**, then click **Next**, you see the following:



3. Enter a **Policy Name**, **MX Model Filter** and **MX Version Filter**, then click **Next**.



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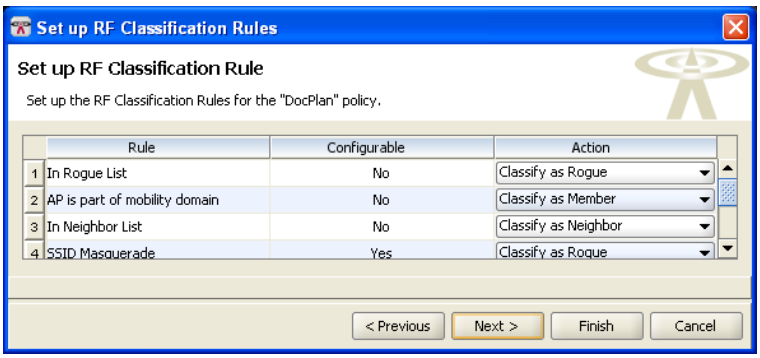
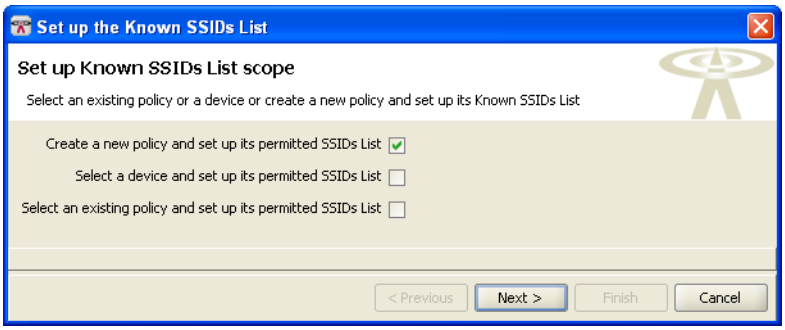
4. Select **Available Devices** to move to **Current Devices** (for inclusion in policy) and then click **Next**.



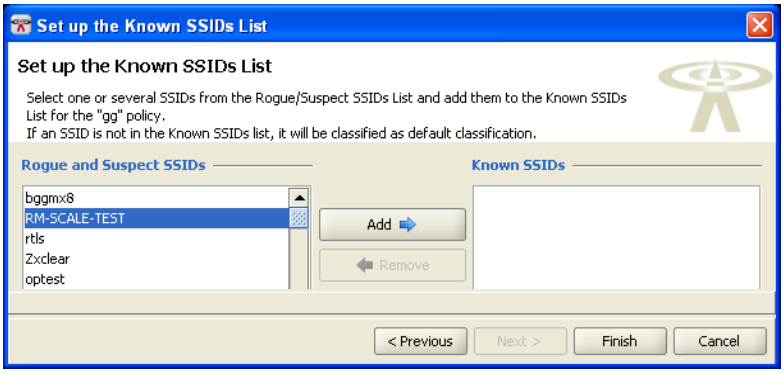
5. Select **RF Classification Rules** as listed in the dialog, then click **Finish**.

Known SSIDs List

If you click **Known SSIDs List**, you see the following dialog:


Set up the Known SSIDs List
Set up Known SSIDs List scope
Select an existing policy or a device or create a new policy and set up its Known SSIDs List
Create a new policy and set up its permitted SSIDs List
Select a device and set up its permitted SSIDs List
Select an existing policy and set up its permitted SSIDs List
< Previous
Next >
Finish
Cancel

1. Make selections to create policies and determine device and policy associations. If you click **Create a new policy...**, you see and complete dialogs like those in step 2 and step 3 above, then you see the following dialog:


Set up the Known SSIDs List
Set up the Known SSIDs List
Select one or several SSIDs from the Rogue/Suspect SSIDs List and add them to the Known SSIDs List for the "gg" policy.
If an SSID is not in the Known SSIDs list, it will be classified as default classification.
Rogue and Suspect SSIDs
Known SSIDs
bggmx8
RM-SCALE-TEST
rtls
Zxclear
optest
Add
Remove
< Previous
Next >
Finish
Cancel

Move **Rogue and Suspect SSIDs** to **Known SSIDs** as appropriate, then click **Finish**.

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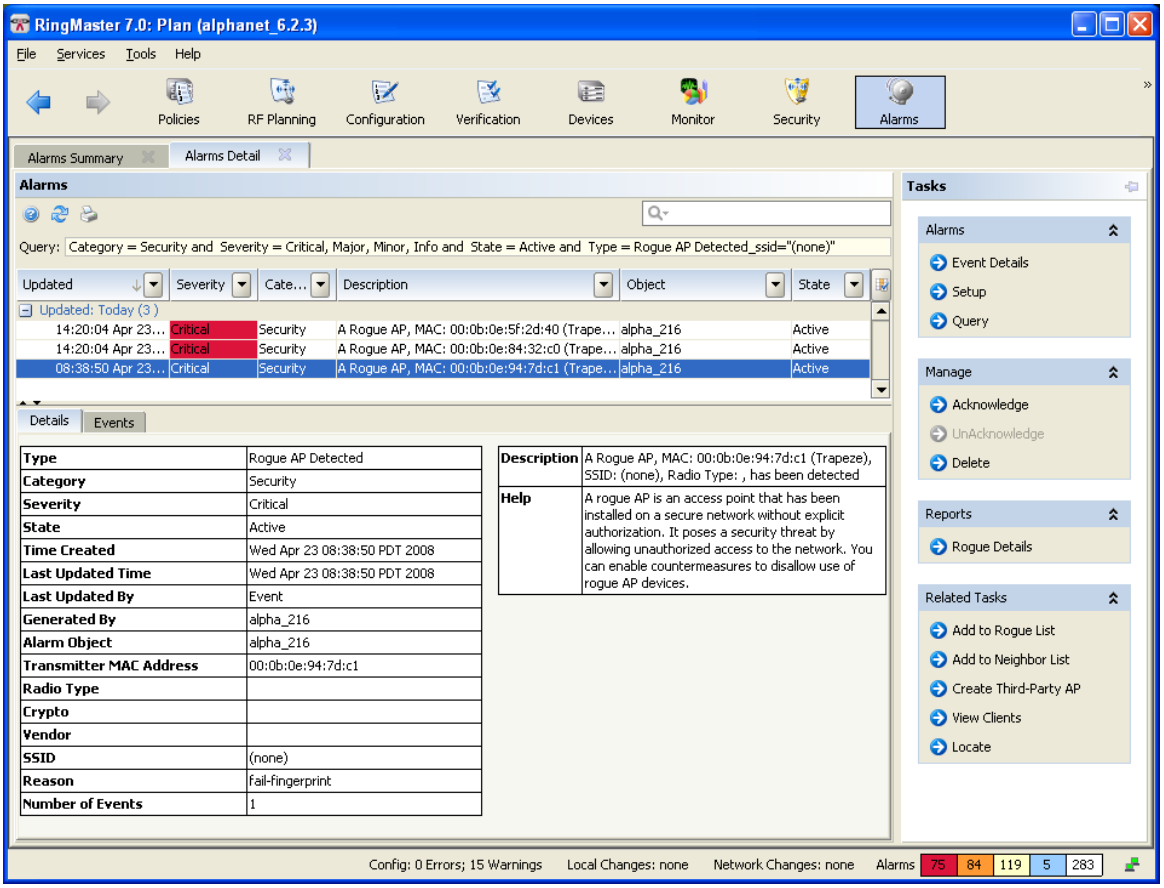
Rogue Devices

If you click **Rogue Devices**, you see a progress screen followed by the window below:


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies RF Planning Configuration Verification Devices Monitor Security Alarms
Alarms Summary Alarms Detail
Alarms
Query: Category = Security and Severity = Critical, Major, Minor, Info and State = Active and Type = Rogue AP Detected_ssid="(none)"
Updated Severity Cate... Description Object State
Updated: Today (3)
14:20:04 Apr 23... Critical Security A Rogue AP, MAC: 00:0b:0e:5f:2d:40 (Trape... alpha_216 Active
14:20:04 Apr 23... Critical Security A Rogue AP, MAC: 00:0b:0e:84:32:c0 (Trape... alpha_216 Active
08:38:50 Apr 23... Critical Security A Rogue AP, MAC: 00:0b:0e:94:7d:c1 (Trape... alpha_216 Active
Details Events
Type Rogue AP Detected
Category Security
Severity Critical
State Active
Time Created Wed Apr 23 08:38:50 PDT 2008
Last Updated Time Wed Apr 23 08:38:50 PDT 2008
Last Updated By Event
Generated By alpha_216
Alarm Object alpha_216
Transmitter MAC Address 00:0b:0e:94:7d:c1
Radio Type
Crypto
Vendor
SSID (none)
Reason fail-fingerprint
Number of Events 1
Description A Rogue AP, MAC: 00:0b:0e:94:7d:c1 (Trapeze), SSID: (none), Radio Type: , has been detected
Help A rogue AP is an access point that has been installed on a secure network without explicit authorization. It poses a security threat by allowing unauthorized access to the network. You can enable countermeasures to disallow use of rogue AP devices.
Tasks
Alarms
Event Details
Setup
Query
Manage
Acknowledge
UnAcknowledge
Delete
Reports
Rogue Details
Related Tasks
Add to Rogue List
Add to Neighbor List
Create Third-Party AP
View Clients
Locate
Config: 0 Errors; 15 Warnings
Local Changes: none
Network Changes: none
Alarms 75 84 119 5 283

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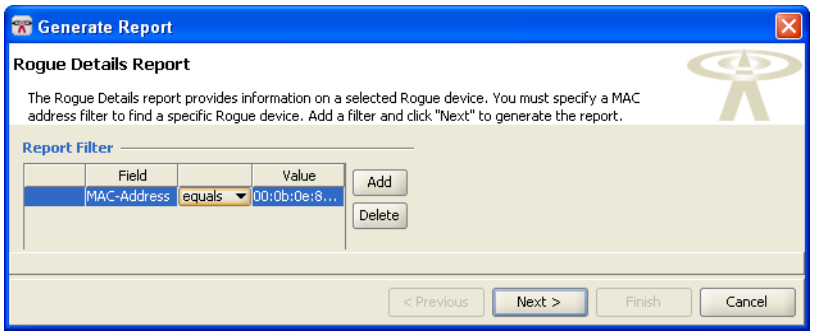
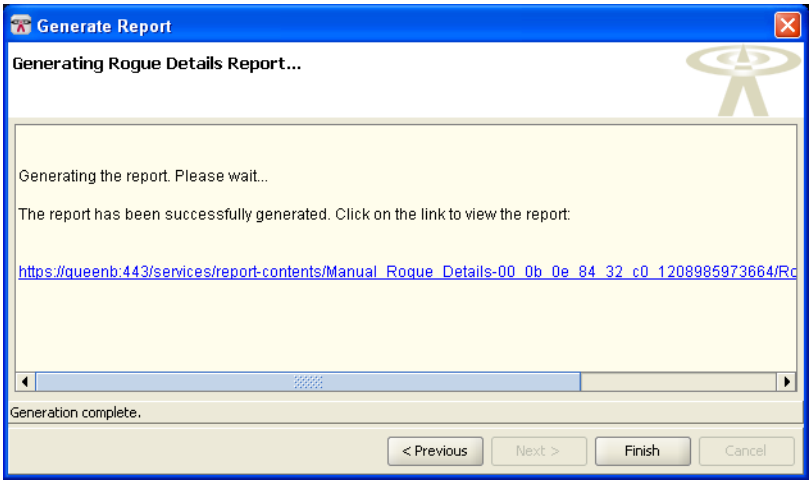
Suspect Devices

If you click **Rogue Devices**, you see a dialog where you specify a rogue by MAC-address and click on **Next**.



You then see the **Generate Report** dialog shown below:



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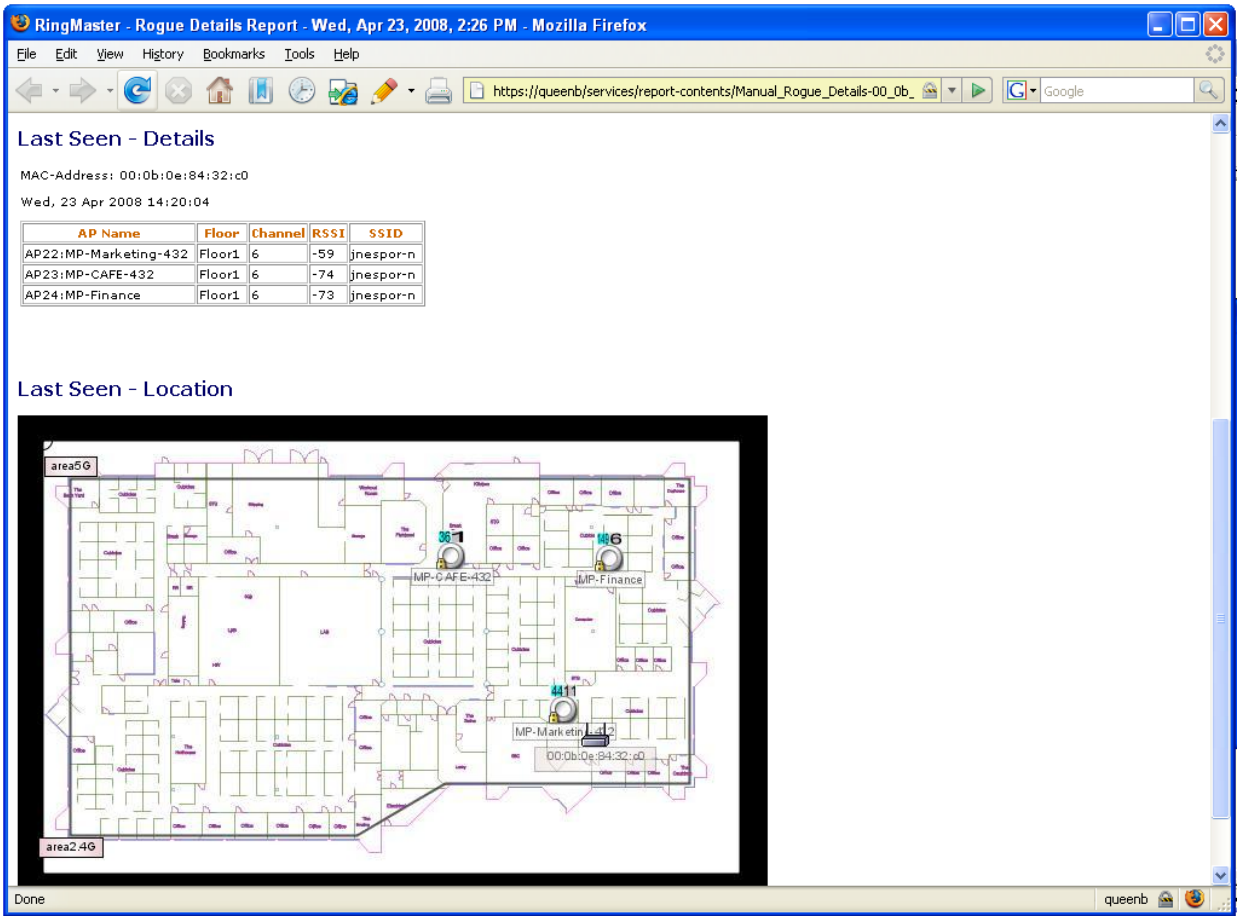
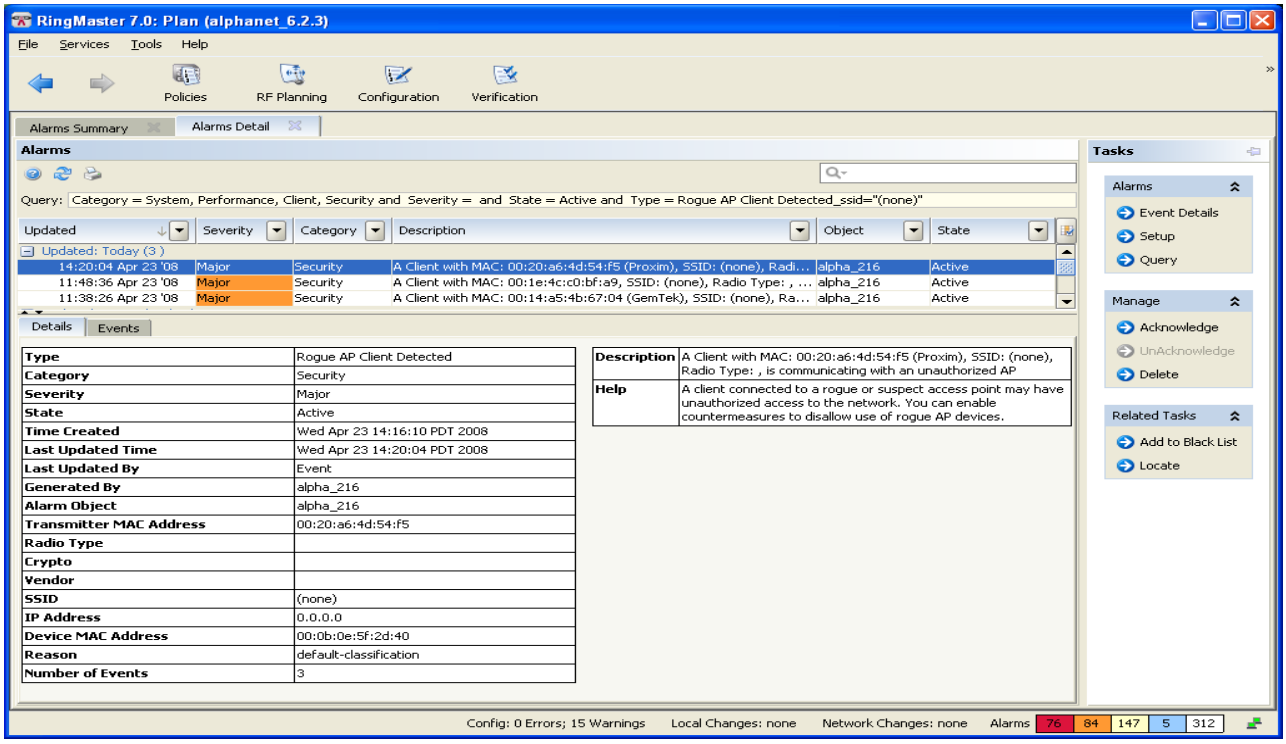
Clicking on the link provided shows the report.


RingMaster - Rogue Details Report - Wed, Apr 23, 2008, 2:26 PM - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://queenb/services/report-contents/Manual_Rogue_Details-00_0b_
Google
Last Seen - Details
MAC-Address: 00:0b:0e:84:32:c0
Wed, 23 Apr 2008 14:20:04
AP Name | Floor | Channel | RSSI | SSID
AP22:MP-Marketing-432 | Floor1 | 6 | -59 | jnespor-n
AP23:MP-CAFE-432 | Floor1 | 6 | -74 | jnespor-n
AP24:MP-Finance | Floor1 | 6 | -73 | jnespor-n
Last Seen - Location
area5G
MP-CAFE-432
MP-Finance
area2.4G
Done
queenb

Click **Finish**.

Clients of Rogue Devices

If you click **Clients of Rogue Devices**, you see the following window:


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies
RF Planning
Configuration
Verification
Alarms Summary
Alarms Detail
Alarms
Query: Category = System, Performance, Client, Security and Severity = and State = Active and Type = Rogue AP Client Detected_ssid="(none)"
Updated
Severity
Category
Description
Object
State
Updated: Today (3)
14:20:04 Apr 23 '08 Major Security A Client with MAC: 00:20:a6:4d:54:f5 (Proxim), SSID: (none), Radi... alpha_216 Active
11:48:36 Apr 23 '08 Major Security A Client with MAC: 00:1e:4c:c0:bf:a9, SSID: (none), Radio Type: , ... alpha_216 Active
11:38:26 Apr 23 '08 Major Security A Client with MAC: 00:14:a5:4b:67:04 (GemTek), SSID: (none), Ra... alpha_216 Active
Details
Events
Type Rogue AP Client Detected
Category Security
Severity Major
State Active
Time Created Wed Apr 23 14:16:10 PDT 2008
Last Updated Time Wed Apr 23 14:20:04 PDT 2008
Last Updated By Event
Generated By alpha_216
Alarm Object alpha_216
Transmitter MAC Address 00:20:a6:4d:54:f5
Radio Type
Crypto
Vendor
SSID (none)
IP Address 0.0.0.0
Device MAC Address 00:0b:0e:5f:2d:40
Reason default-classification
Number of Events 3
Description A Client with MAC: 00:20:a6:4d:54:f5 (Proxim), SSID: (none), Radio Type: , is communicating with an unauthorized AP
Help A client connected to a rogue or suspect access point may have unauthorized access to the network. You can enable countermeasures to disallow use of rogue AP devices.
Tasks
Alarms
Event Details
Setup
Query
Manage
Acknowledge
UnAcknowledge
Delete
Related Tasks
Add to Black List
Locate
Config: 0 Errors; 15 Warnings
Local Changes: none
Network Changes: none
Alarms 76 84 147 5 312

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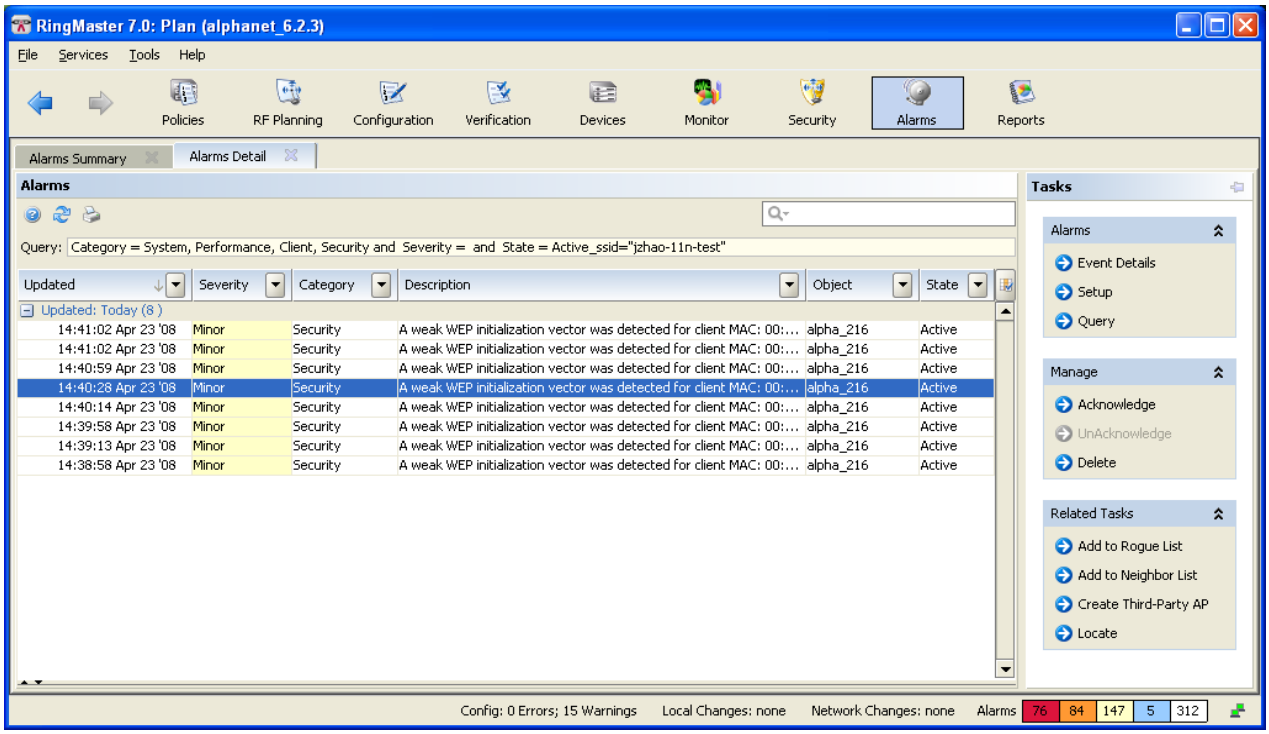
Unauthorized Devices

If you click **Unauthorized Devices**, you see the following dialog:


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Alarms Summary Alarms Detail
Alarms
Query: Category = System, Performance, Client, Security and Severity = and State = Active_ssid="jzhao-11n-test"
Updated Severity Category Description Object State
Updated: Today (8)
14:41:02 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:41:02 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:40:59 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:40:28 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:40:14 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:39:58 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:39:13 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:38:58 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
Tasks
Alarms
Event Details
Setup
Query
Manage
Acknowledge
UnAcknowledge
Delete
Related Tasks
Add to Rogue List
Add to Neighbor List
Create Third-Party AP
Locate
Config: 0 Errors; 15 Warnings
Local Changes: none
Network Changes: none
Alarms 76 84 147 5 312

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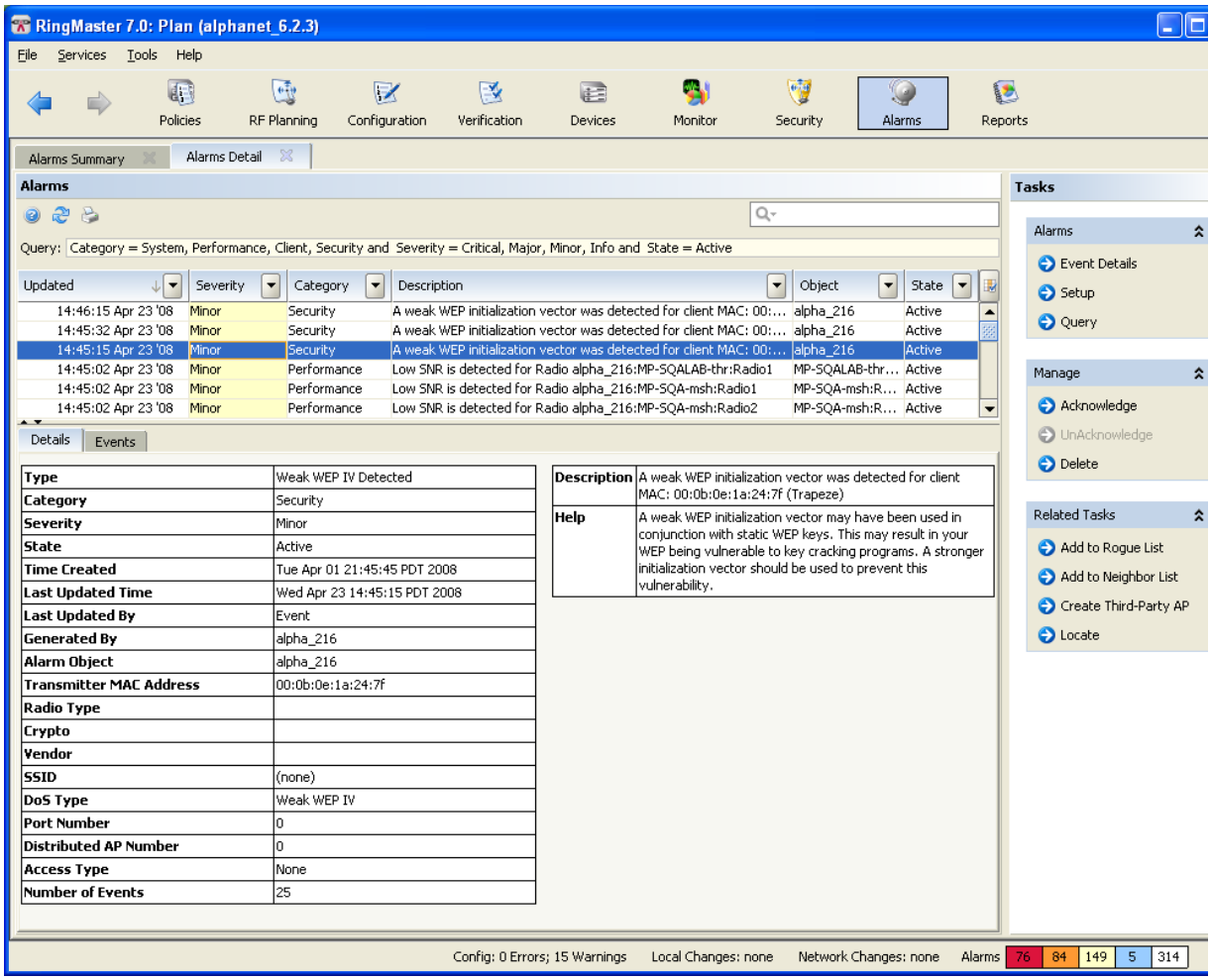
Displaying Rogue Information

To display rogue information, select the **Monitor** button on the main *RingMaster* Navigation Bar and click on **Details** in the **Alarm Summary** area to see the **Alarms Detail** window below.


RingMaster 7.0: Plan (alphanet_6.2.3)
File Services Tools Help
Policies RF Planning Configuration Verification Devices Monitor Security Alarms Reports
Alarms Summary Alarms Detail
Alarms
Query: Category = System, Performance, Client, Security and Severity = Critical, Major, Minor, Info and State = Active
Updated Severity Category Description Object State
14:46:15 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:45:32 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:45:15 Apr 23 '08 Minor Security A weak WEP initialization vector was detected for client MAC: 00:... alpha_216 Active
14:45:02 Apr 23 '08 Minor Performance Low SNR is detected for Radio alpha_216:MP-SQALAB-thr:Radio1 MP-SQALAB-thr... Active
14:45:02 Apr 23 '08 Minor Performance Low SNR is detected for Radio alpha_216:MP-SQA-msh:Radio1 MP-SQA-msh:R... Active
14:45:02 Apr 23 '08 Minor Performance Low SNR is detected for Radio alpha_216:MP-SQA-msh:Radio2 MP-SQA-msh:R... Active
Details Events
Type Weak WEP IV Detected
Category Security
Severity Minor
State Active
Time Created Tue Apr 01 21:45:45 PDT 2008
Last Updated Time Wed Apr 23 14:45:15 PDT 2008
Last Updated By Event
Generated By alpha_216
Alarm Object alpha_216
Transmitter MAC Address 00:0b:0e:1a:24:7f
Radio Type
Crypto
Vendor
SSID (none)
DoS Type Weak WEP IV
Port Number 0
Distributed AP Number 0
Access Type None
Number of Events 25
Description A weak WEP initialization vector was detected for client MAC: 00:0b:0e:1a:24:7F (Trapeze)
Help A weak WEP initialization vector may have been used in conjunction with static WEP keys. This may result in your WEP being vulnerable to key cracking programs. A stronger initialization vector should be used to prevent this vulnerability.
Tasks
Alarms
Event Details
Setup
Query
Manage
Acknowledge
UnAcknowledge
Delete
Related Tasks
Add to Rogue List
Add to Neighbor List
Create Third-Party AP
Locate
Config: 0 Errors; 15 Warnings
Local Changes: none
Network Changes: none
Alarms 76 84 149 5 314

Each rogue is listed only once, even if multiple entries for it appear in the **Alarms** log. If a rogue is detected during three polling intervals, separate entries for each interval appear in the **Alarms** log. You can adjust selection criteria on the fault dashboard to filter an alarm list to display the following types of entries:

- **Rogue APs** — Unauthorized APs on the Trapeze network.
- **Interfering APs** — Devices that are not part of the Trapeze network but also are not rogues. No clients connected to these devices have been detected communicating with any network entity listed in the forwarding database (FDB) of any MX in a Mobility Domain. Although interfering devices are not connected to your network, they might be causing RF interference with AP radios.
- **Suspect APs** — Devices that are not part of the Trapeze network and are suspected as rogues
- **Ad-hoc clients** — Clients configured to communicate wirelessly outside of the network infrastructure. Ad-hoc clients are not necessarily malicious, but they steal bandwidth from your infrastructure users. Ad-hoc clients are further categorized into rogues and interfering devices. The word **Rogue** or **Interfering** appears in parentheses next to the word **Ad-hoc**.

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Displaying Rogue Details

To display information about a rogue, select the rogue. Additional information appears in the lower section of the screen as shown above.

Table 1– 2 describes the fields that appear on the Alarm Details for a rogue.

Table 1– 2. Alarm Details for Rogues

Field	Description
Type	The alarm type; for example, Rogue AP Detected.
Category	The category of alarm; alarms generated by rogue fall into the Security category.
State	The status of the alarm.
Time Created	The time the alarm was created.
Last Updated Time	The time the alarm was last updated by RingMaster
Last Updated By	Where in RingMaster the alarm was updated.
Generated By	The device that generated the alarm
Alarm Object	The device where the rogue alarm was detected.
Transmitter MAC address	The MAC address used by the rogue to transmit data
Radio Type	Radio technology.
Crypto	Encryption used.
Vendor	Manufacurer of device.
SSID	SSID of the rogue.
DoS Type	Type of vulnerability.
Port Number	Port number involved.
Distributed AP Number	Assigned number for this AP.
Access Type	Access to this device.
Number of Events	Count of events associated with this rogue.
Description	Description of items detected.
Help	Information of risks associated with this rogue.

Table 1– 3 describes the fields that appear on the **Events** tab for a rogue.

Table 1– 3. Events tab information for Rogues

Column	Description
Time Occurred	When the event related to the rogue alarm occurred.

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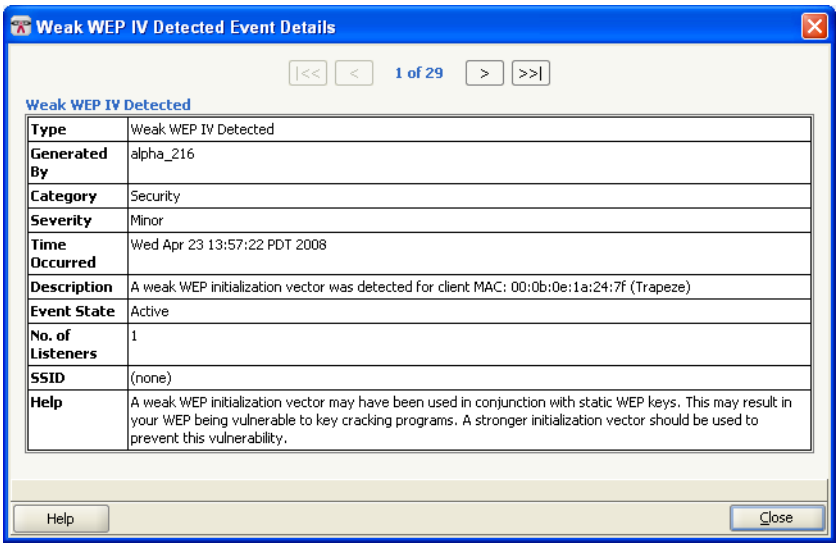
Table 1– 3. Events tab information for Rogues (continued)

Column	Description
Description	Description of the event related to the rogue alarm.
Event State	Whether the rogue was detected in the network at the time the event was recorded.
No. of Listeners	Number of AP radios that detected the rogue or noted its absence.
SSID	SSID of the rogue.

To display additional details , select the rogue in the alarm list, then click **Event Details** in the **Tasks** panel. An example dialog is shown here:



Displaying Rogue Client Information

To display details about the clients of rogue devices, select the rogue in the alarm list, then click **View Clients** in the **Tasks** panel. You see a dialog like the example here:

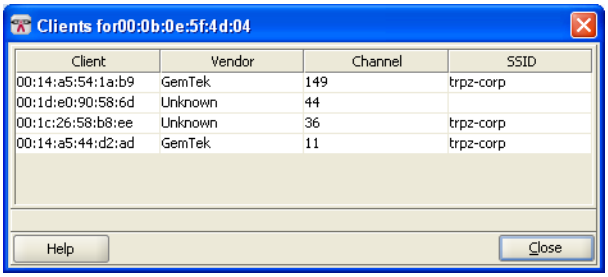


Table 1– 4 lists the information displayed on about clients of rogue devices.

Table 1– 4. Clients Columns

Column	Description
Client	MAC address of the client.
Vendor	Manufacturer of the client.

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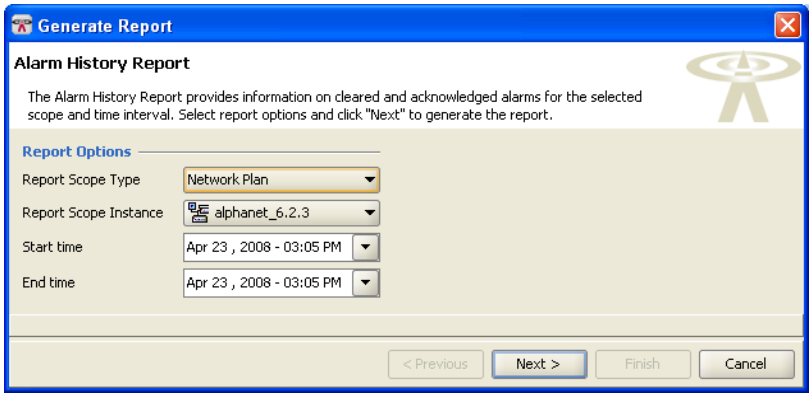
Table 1– 4. Clients Columns (continued)

Column	Description
Channel	Channel the client is on.
SSID	SSID the client is associated with.

Displaying Rogue History

To display the alarms generated during the most-recent 30-day period, click **Alarm History** in the **Tasks** panel. You see the **Alarm History Report** dialog, where you select a **Report Scope Type**, **Report Scope Instance**, **Start Time** and **End Time** and click **Next** to invoke report generation.


Generate Report
Alarm History Report
The Alarm History Report provides information on cleared and acknowledged alarms for the selected scope and time interval. Select report options and click "Next" to generate the report.
Report Options
Report Scope Type
Network Plan
Report Scope Instance
alphanet_6.2.3
Start time
Apr 23 , 2008 - 03:05 PM
End time
Apr 23 , 2008 - 03:05 PM
< Previous
Next >
Finish
Cancel

You then see the **Generate Report** dialog, where you click the likk provided to get the report.

Click **Finish**.

Displaying the Location of a Rogue

If building and floor information for the site is modeled in the network plan, you can display the likely physical location of a rogue, as well as clients associated with the rogue. RingMaster displays the floor plan for the floor where the rogue is believed to be located, and displays the areas where the rogue is probably located.

This option displays the likely location of the rogue when the data was collected by the monitoring service from the seed switch and a Mobility Domain. If the rogue has moved since then, the location information is out of date.

To display the location of a rogue within a site:

1. Select a rogue in the alarm list.

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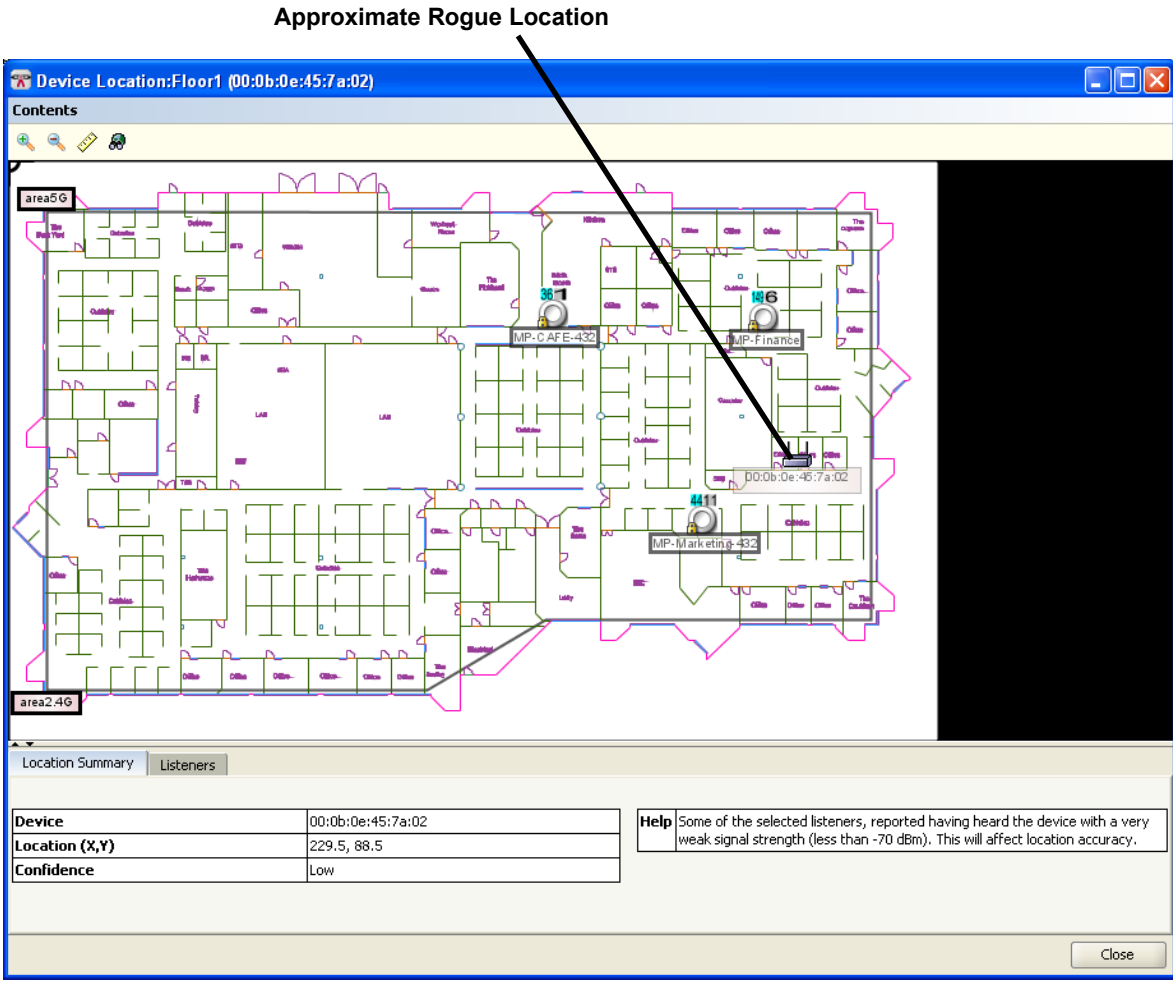
2. In the **Tasks** panel, under **Related Tasks**, click **Locate**. The **Device Location** screen appears, indicating the approximate location of the rogue



3. To change the APs used for calculating the location of a rogue, click the **Listeners** tab and select or deselect APs from the list, then click Locate.

To display the location of a client associated with a rogue:

1. Select the rogue client in the **Alarm** list.
2. In the **Tasks** panel, under **Related Tasks**, click **Locate**.

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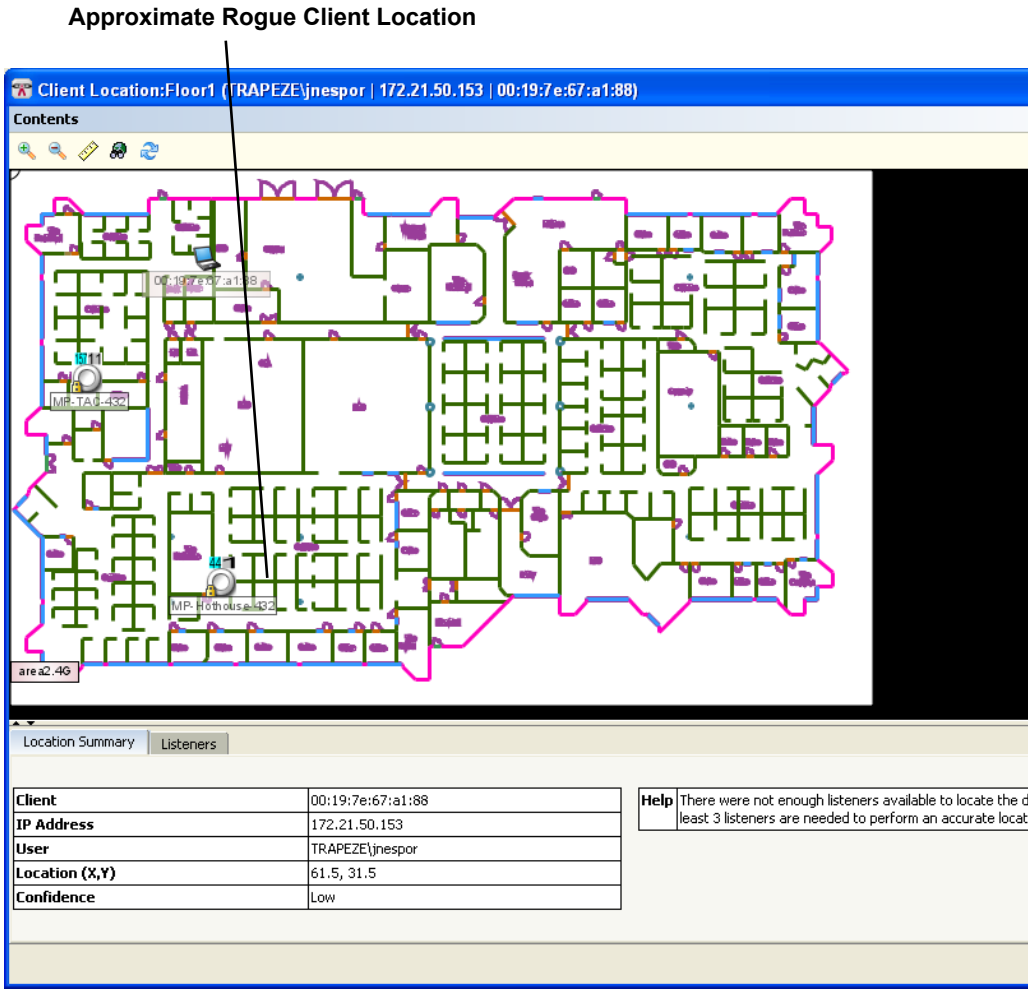
The **Client Location** screen appears, indicating the approximate location of the client



3. To change the APs used for calculating the location of a client, click the **Listeners** tab and select or deselect APs from the list, then click (Locate).

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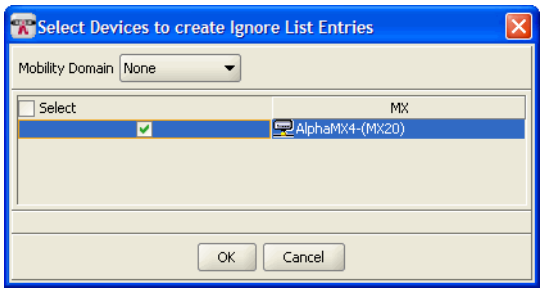
Ignoring Friendly Third-Party Devices

By default, when countermeasures are enabled, MSS considers any third-party transmitter to be a rogue device and can send countermeasures to prevent clients from using that device. To prevent MSS from sending countermeasures against a friendly device, add the device to the Ignore list.

Each MX has an **Ignore** list. You can add an address to the **Ignore** list of one or multiple MXs.

To add a device to the **Ignore** list:

1. In the list of rogues on the **Alarm** screen, select the devices to add to the **Ignore** list.
2. Click **Add to Ignore List** in the **Tasks** panel. The **Select Devices to Create Ignore list Entries** dialog is displayed.

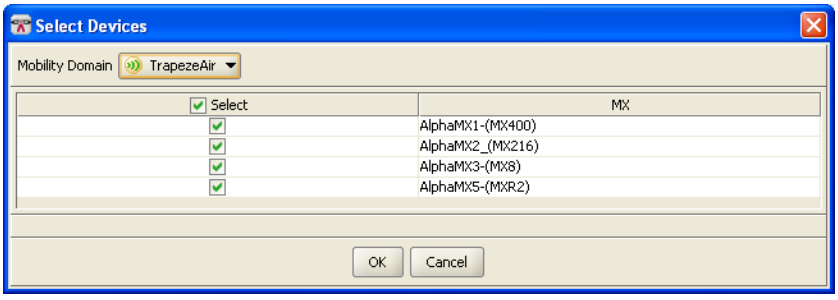


3. If the MXs on which you are configuring an ignore list are in a Mobility Domain, select the Mobility Domain. Otherwise, select None.
4. Click next to **Select** to select all MXs listed, or click next to individual MXs to select them.
5. Click **OK**. Devices are added to the ignore list and disappear from the list of rogues in the **Alarm** screen.

Adding a Device to the Rogue List

The rogue list is a list of AP MAC addresses belonging to a switch. *RingMaster* attacks the AP MAC addresses in the rogue list whenever they are present on the network.

1. From the list of rogues on the **Alarm** screen, select devices you want to place on the rogue list.
2. Click **Add to Rogue List** in the **Tasks** panel. The **Select Devices** dialog is displayed.
3. If the MXs on which you are configuring a rogue list are in a Mobility Domain, select the Mobility Domain. Otherwise, select **None**.
4. Click next to **Select** to select all MXs listed, or click next to individual MXs to select them.



5. Click **OK**. Devices are added to the rogue list. If countermeasures are enabled, MSS uses them to attack devices on the list.

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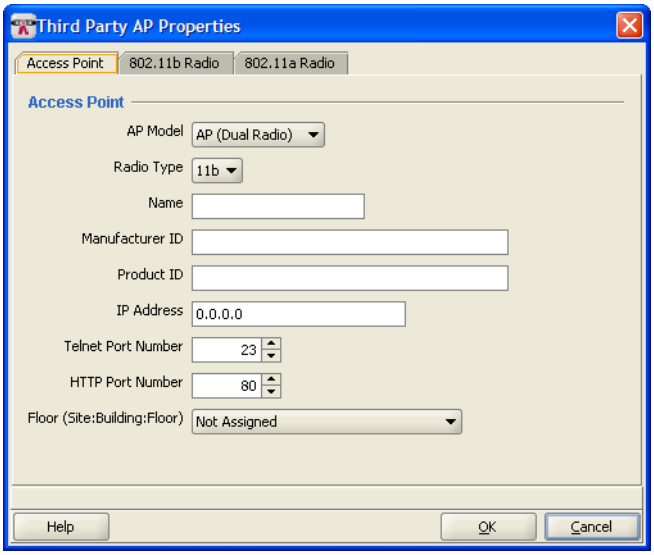
Converting a Rogue into a Third Party AP

If a device in the alarm list belongs to a third-party AP in your network, you can convert the rogue into a third-party AP. When you convert a rogue into a third-party AP, the rogue disappears from the alarm list, and allows you to place the AP in your network plan.

Converting a rogue into a third-party AP applies only to the network plan. RingMaster does not send this information in any form to the MXs in the network. To prevent MSS from issuing countermeasures against a third-party AP, you must also add the AP to the Ignore list. RingMaster does send the Ignore list to the MXs in the network.

To convert a rogue into a third-party AP:

1. In the **Alarm** screen rogues list, select the device you want to convert to a third-party AP.
2. Click **Create Third Party AP** in the **Tasks** panel. The **Third Party AP Properties** dialog is displayed.



3. Enter the information for the AP and place the icon for the AP in the floor location, if applicable. (See “Placing Third-Party Access Points” on page 105.) When you have finished, the AP appears under Objects to Place in RF Planning.
4. To display the list, select the **Configuration** option in *RingMaster* Navigation Bar and click on **Third Party APs** in the **Organizer** panel. Third-party APs are listed in the **Content** panel.

To remove a third-party AP:

1. Select the **Configuration** button on the *RingMaster* Navigation Bar and click on **Third Party APs** in the **Organizer** panel. Third-party APs are listed in the **Content** panel.
2. Select the third-party AP you want to remove and click the **Delete** button. The address is removed from the third-party AP list. If a device is detected by rogue detection, it appears in the rogue list. Set the display filter of the **Rogue Detection** screen to **Current** and click the **Refresh** option on the toolbar.

Adding Clients Belonging to a Rogue to the Black List

The **Client Black List** is a list of MAC addresses belonging to wireless clients not allowed on the network. MSS prevents clients on the list from accessing the network through an MX.

1. In the **Alarm** screen, select the client to place on the **Black List**.
2. Click **Add to Black List** on the toolbar. The **Select Devices** dialog is displayed.
3. Select the clients you want to add to the Black List. The **Select Devices** dialog is displayed.

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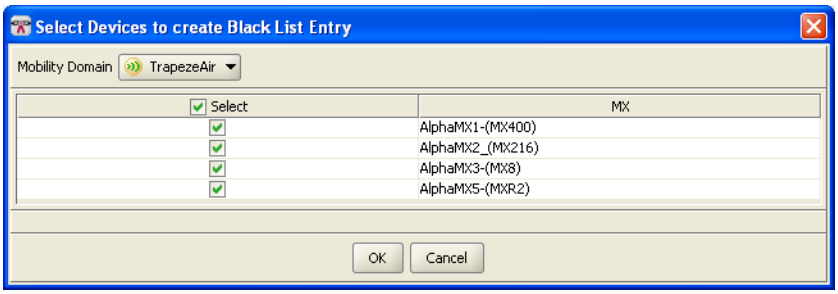
4. If MXs on the Black List are in a Mobility Domain, select the Mobility Domain. Otherwise, select **None**.
5. Click next to **Select** to select all of MXs listed, or click next to individual MXs to select them.



6. Click **OK**. Selected clients are added to the black list. MSS drops all packets from these clients.

Configuring RF Detection Options from the Organizer Panel

Although the Rogue Detection tools provide a way to configure rogue detection features, you can also configure rogue detection settings for a single MX. See “Viewing and Changing RF Detection Settings” in the publication *RingMaster Configuration Guide*.

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RingMaster Reports

The **Reports** button on the *RingMaster* Navigation Bar enables you to generate reports for network clients, RF usage, rogue devices, and Trapeze equipment. Reports are grouped by feature and listed alphabetically in the Organizer panel.

RingMaster collects data from the network and stores it in a database on the server. You can also store reports on an FTP server in your network or store them locally. This data is available in the following reports:

- **Client Monitoring Reports**
  - Client Summary
  - Client Details
  - Client Errors
- **Traffic Reports**
  - Network Usage (Port Traffic)
  - Network Usage (Radio Traffic)
- **RF Statistics**
  - RF Summary
  - Radio Details
- **Rogue Reports**
  - Rogue Details
  - Rogue Summary
- **Alarm Reports**
  - Alarm Summary
  - Alarm History
  - Security
  - Client OUI
- **RF Planning Reports:**
  - Site Survey Order
  - Work Order

For each report, use the wizard to configure the report scope type, report scope instance, and time period settings. Some reports may require additional parameters. *RingMaster* generates a report and saves it on the server. To view the report, click the report link provided by the wizard. (For more information on *RingMaster* reports, see Chapter , “RingMaster Reports,” on page 161.)

Report Types

The various reports that can be created include:

- **Inventory Report**
- **Inventory Report**
- **Mobility Domain Configuration Report**
- **MX Configuration Report**
- **Client Summary Report**
- **Client Details Report**
- **Client Errors Report**
- **Top APs**
- **SmartPass Accounting Summary**
- **SmartPass Accounting Details**
- **Network Usage (Port Traffic) Report**
- **Network Usage (Radio Traffic) Report**
- **RF Summary Report**

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- Radio Details Report
- Rogue Summary Report
- Rogue Details Report
- Alarm Summary Report
- Alarm History Report
- Security Report
- Client OUI Report
- Site Survey Order
- Work Order

RingMaster uses a database to collect and store client, RF, and other system dynamic data, such as statistics, status, events, and traps. You can generate reports from the monitoring and configuration data collected in the database. When you generate a report, you specify a scope and time period for the report. Some reports also have additional options.

RingMaster saves both automatically and manually generated reports on the server in HTML format. You can also store reports on an FTP server in your network or store them locally. You can view a list of saved reports, view a report, delete a saved report, generate a new report, or schedule a report to be automatically generated and e-mailed.

Report Descriptions

Each type of report available is described in this section.

All Report Type Item

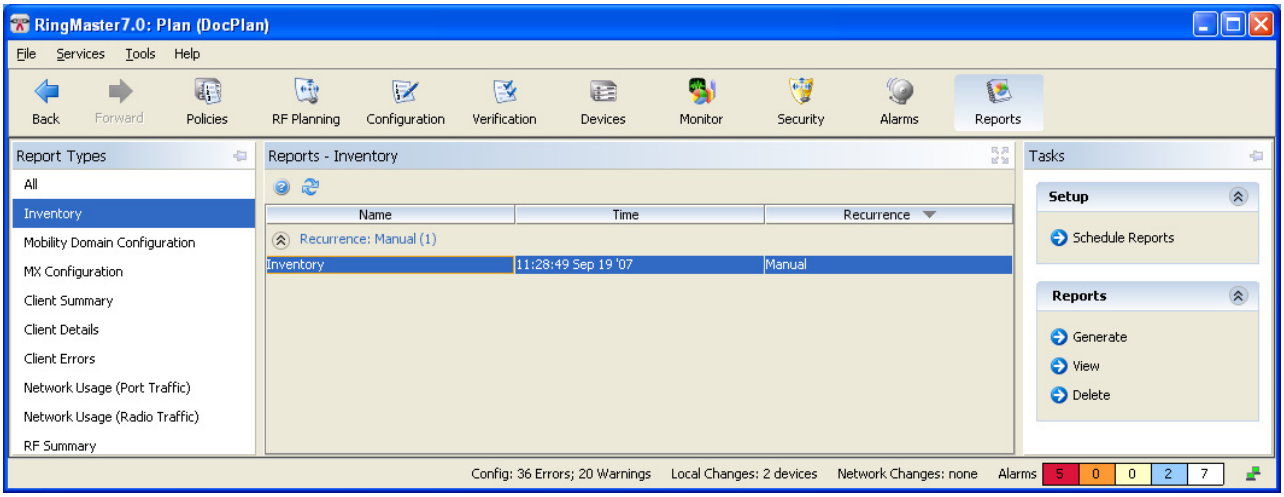
Selection of this item displays All reports that have been generated, regardless of type. You can click on an individual report to view it.

Inventory Report

The inventory report lists the MXs and AP access points in a specific Mobility Domain or that do not belong to a Mobility Domain.

To generate an inventory report:

1. Select the **Reports** Navigation Bar button.
2. In the **Report Types** list, select **Inventory**.



3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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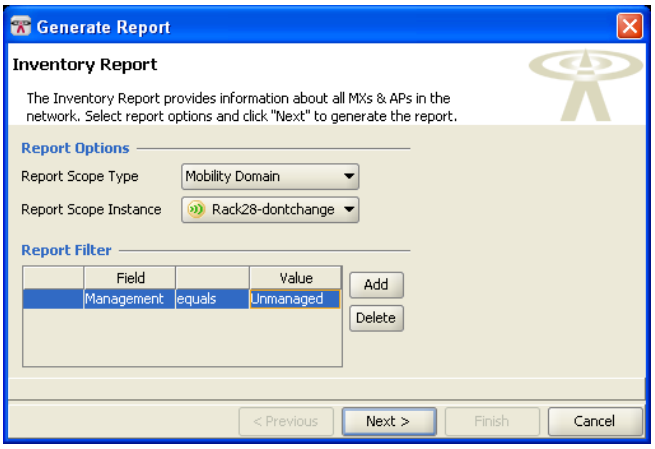
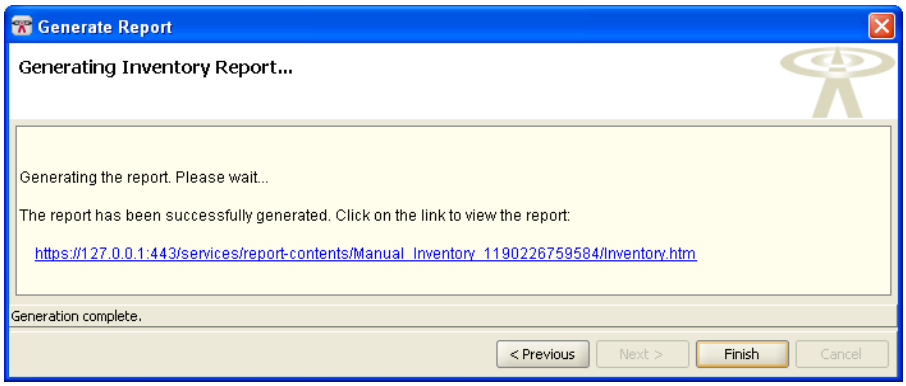
4. To generate a new report, choose the **Reports** section **Generate** item from the **Tasks** panel to display the **Generate Report > Inventory Report** dialog.



5. Select the scope type of the report from the **Report Options** area:
   - **Report Scope Type**
     - **Network Plan**
     - **Mobility Domain**
   - **Report Scope Instance**
     Select the Report Scope Instance for which you want a report. For example, if the scope is Mobility Domain, select the Mobility Domain.
6. You can add report filters using fields and values in the **Report Filter** area.
7. Click **Next** to generate a report.



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8. When the report is generated, click the report link provided to view it in the default browser.

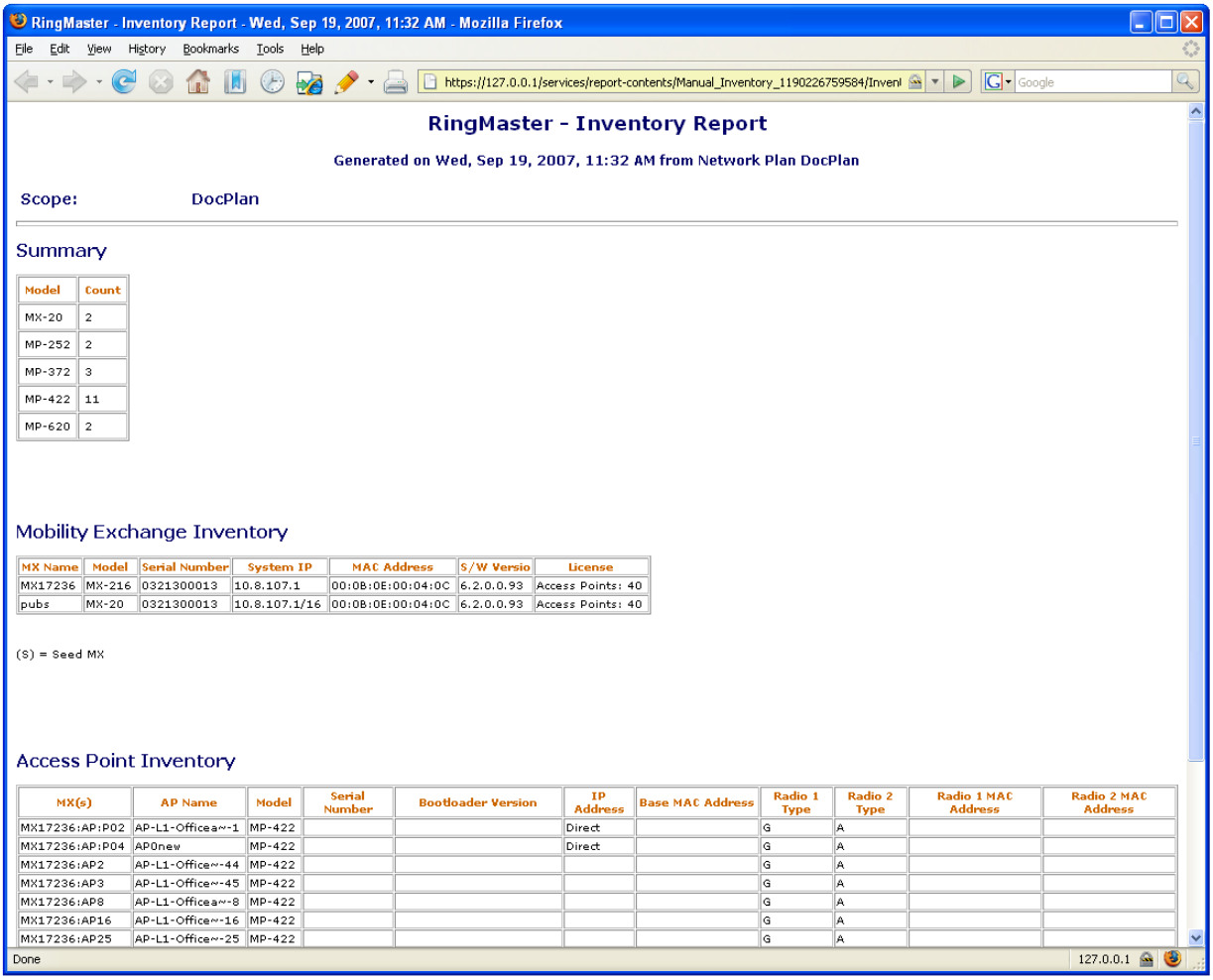
RingMaster - Inventory Report - Wed, Sep 19, 2007, 11:32 AM - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://127.0.0.1/services/report-contents/Manual_Inventory_1190226759584/Invent
RingMaster - Inventory Report
Generated on Wed, Sep 19, 2007, 11:32 AM from Network Plan DocPlan
Scope: DocPlan
Summary
Model Count
MX-20 2
MP-252 2
MP-372 3
MP-422 11
MP-620 2
Mobility Exchange Inventory
MX Name Model Serial Number System IP MAC Address S/W Versio License
MX17236 MX-216 0321300013 10.8.107.1 00:0B:0E:00:04:0C 6.2.0.0.93 Access Points: 40
pubs MX-20 0321300013 10.8.107.1/16 00:0B:0E:00:04:0C 6.2.0.0.93 Access Points: 40
(S) = Seed MX
Access Point Inventory
MX(s) AP Name Model Serial Number Bootloader Version IP Address Base MAC Address Radio 1 Type Radio 2 Type Radio 1 MAC Address Radio 2 MAC Address
MX17236:AP:P02 AP-L1-Officea~-1 MP-422 Direct G A
MX17236:AP:P04 APOnew MP-422 Direct G A
MX17236:AP2 AP-L1-Office~-44 MP-422 G A
MX17236:AP3 AP-L1-Office~-45 MP-422 G A
MX17236:AP8 AP-L1-Officea~-8 MP-422 G A
MX17236:AP16 AP-L1-Office~-16 MP-422 G A
MX17236:AP25 AP-L1-Office~-25 MP-422 G A
Done
127.0.0.1

Table 1– 1 lists the sections in the Inventory Report.

Table 1– 1. Inventory Report Sections

Section	Description
Summary	Lists the equipment models and the number of each model in the network plan for the selected Mobility Domain.
Mobility Exchange Inventory	Lists information for each MX in the selected Mobility Domain.
Access Point Inventory	Lists information for each AP in the selected Mobility Domain.

Mobility Domain Configuration Report

A Mobility Domain Configuration Report lists information on all MXs in a Mobility Domain, including VLANs, radio/service profiles, RADIUS server groups, and servers configured on MXs.

To generate a Mobility Domain Configuration report:

1. Select the **Reports** Navigation Bar button.

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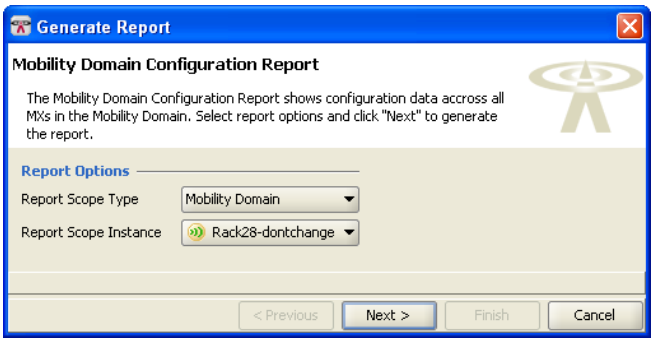
2. In the Report Types list, select **Mobility Domain Configuration**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click **Generate** to display the **Generate Reports > Mobility domain Configuration Report** dialog.


Generate Report
Mobility Domain Configuration Report
The Mobility Domain Configuration Report shows configuration data accross all MXs in the Mobility Domain. Select report options and click "Next" to generate the report.
Report Options
Report Scope Type
Mobility Domain
Report Scope Instance
Rack28-dontchange
< Previous
Next >
Finish
Cancel

5. Select the scope type of the report from the **Report Options** area:
   - **Report Scope Type**
     - **Network Plan**
     - **Mobility Domain**
   - **Report Scope Instance**

     Select the Report Scope Instance for which you want a report. For example, if the scope is Mobility Domain, select the Mobility Domain.
6. Click **Next** to generate a report.

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7. When the report is generated, click the Report link to view it in your default browser.

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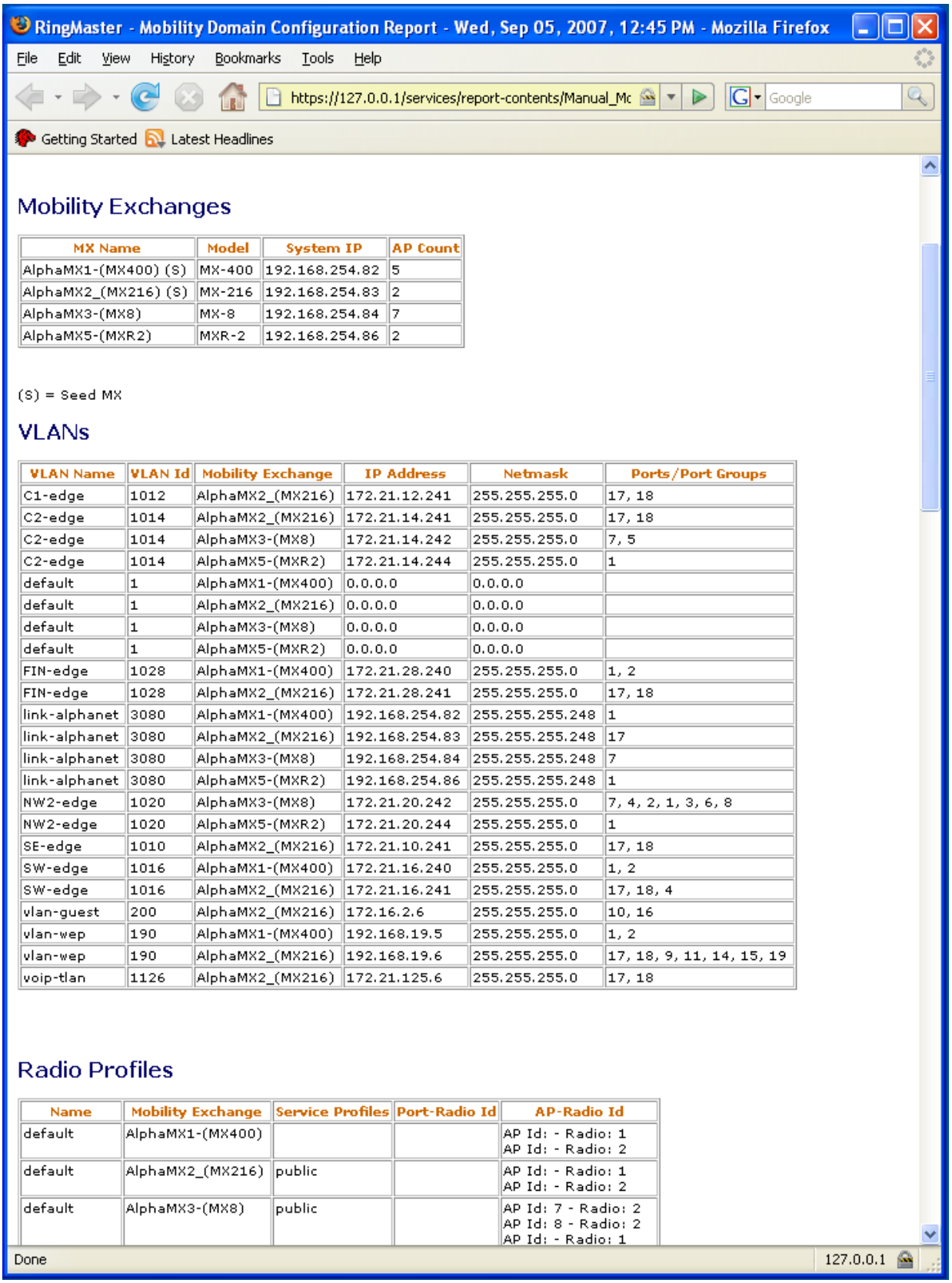

Mobility Exchanges

MX Name	Model	System IP	AP Count
AlphaMX1-(MX400) (S)	MX-400	192.168.254.82	5
AlphaMX2_(MX216) (S)	MX-216	192.168.254.83	2
AlphaMX3-(MX8)	MX-8	192.168.254.84	7
AlphaMX5-(MXR2)	MXR-2	192.168.254.86	2

(S) = Seed MX

VLANs

VLAN Name	VLAN Id	Mobility Exchange	IP Address	Netmask	Ports/Port Groups
C1-edge	1012	AlphaMX2_(MX216)	172.21.12.241	255.255.255.0	17, 18
C2-edge	1014	AlphaMX2_(MX216)	172.21.14.241	255.255.255.0	17, 18
C2-edge	1014	AlphaMX3-(MX8)	172.21.14.242	255.255.255.0	7, 5
C2-edge	1014	AlphaMX5-(MXR2)	172.21.14.244	255.255.255.0	1
default	1	AlphaMX1-(MX400)	0.0.0.0	0.0.0.0	
default	1	AlphaMX2_(MX216)	0.0.0.0	0.0.0.0	
default	1	AlphaMX3-(MX8)	0.0.0.0	0.0.0.0	
default	1	AlphaMX5-(MXR2)	0.0.0.0	0.0.0.0	
FIN-edge	1028	AlphaMX1-(MX400)	172.21.28.240	255.255.255.0	1, 2
FIN-edge	1028	AlphaMX2_(MX216)	172.21.28.241	255.255.255.0	17, 18
link-alphanet	3080	AlphaMX1-(MX400)	192.168.254.82	255.255.255.248	1
link-alphanet	3080	AlphaMX2_(MX216)	192.168.254.83	255.255.255.248	17
link-alphanet	3080	AlphaMX3-(MX8)	192.168.254.84	255.255.255.248	7
link-alphanet	3080	AlphaMX5-(MXR2)	192.168.254.86	255.255.255.248	1
NW2-edge	1020	AlphaMX3-(MX8)	172.21.20.242	255.255.255.0	7, 4, 2, 1, 3, 6, 8
NW2-edge	1020	AlphaMX5-(MXR2)	172.21.20.244	255.255.255.0	1
SE-edge	1010	AlphaMX2_(MX216)	172.21.10.241	255.255.255.0	17, 18
SW-edge	1016	AlphaMX1-(MX400)	172.21.16.240	255.255.255.0	1, 2
SW-edge	1016	AlphaMX2_(MX216)	172.21.16.241	255.255.255.0	17, 18, 4
vlan-guest	200	AlphaMX2_(MX216)	172.16.2.6	255.255.255.0	10, 16
vlan-wep	190	AlphaMX1-(MX400)	192.168.19.5	255.255.255.0	1, 2
vlan-wep	190	AlphaMX2_(MX216)	192.168.19.6	255.255.255.0	17, 18, 9, 11, 14, 15, 19
voip-tlan	1126	AlphaMX2_(MX216)	172.21.125.6	255.255.255.0	17, 18

Radio Profiles

Name	Mobility Exchange	Service Profiles	Port-Radio Id	AP-Radio Id
default	AlphaMX1-(MX400)			AP Id: - Radio: 1 AP Id: - Radio: 2
default	AlphaMX2_(MX216)	public		AP Id: - Radio: 1 AP Id: - Radio: 2
default	AlphaMX3-(MX8)	public		AP Id: 7 - Radio: 2 AP Id: 8 - Radio: 2 AP Id: - Radio: 1

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Table 1– 2 lists the sections in the report.

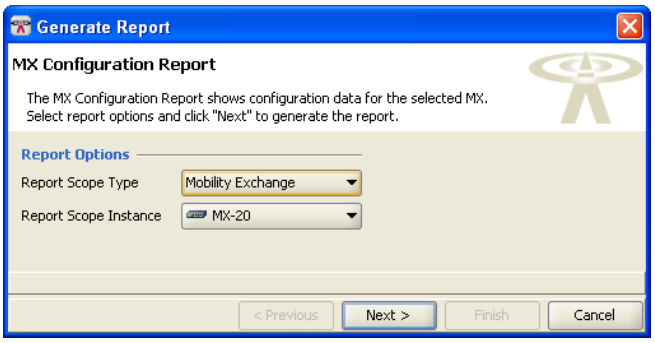
Table 1– 2. Mobility Domain Configuration Report Sections

Section	Description
Mobility Exchanges	Name, model, and system IP address of each MX in the Mobility Domain. The number of directly attached and Distributed APs configured on each switch are also listed.
VLANs	VLANs configured on the MXs.
Radio Profiles	Radio profiles configured on the MXs.
Service Profiles	Service profiles configured on the MXs.
RADIUS Server Groups	RADIUS server groups configured on the MXs.
RADIUS Servers	RADIUS servers configured on the MXs.
APs	Lists information for each AP in the selected Mobility Domain.

MX Configuration Report

The MX configuration report lists configuration details for an MX.

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **MX Configuration**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click **Generate** to display the **Generate Reports > MX Configuration Report** dialog.



5. Select the scope type of the report from the **Report Options** area:
   - **Report Scope Type**
     - **Network Plan**
     - **Mobility Domain**
   - **Report Scope Instance**
     Select the MX for which you want a report.
6. Click **Next** to generate a report.

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7. When the report is generated, click the report link to view it in the default browser.

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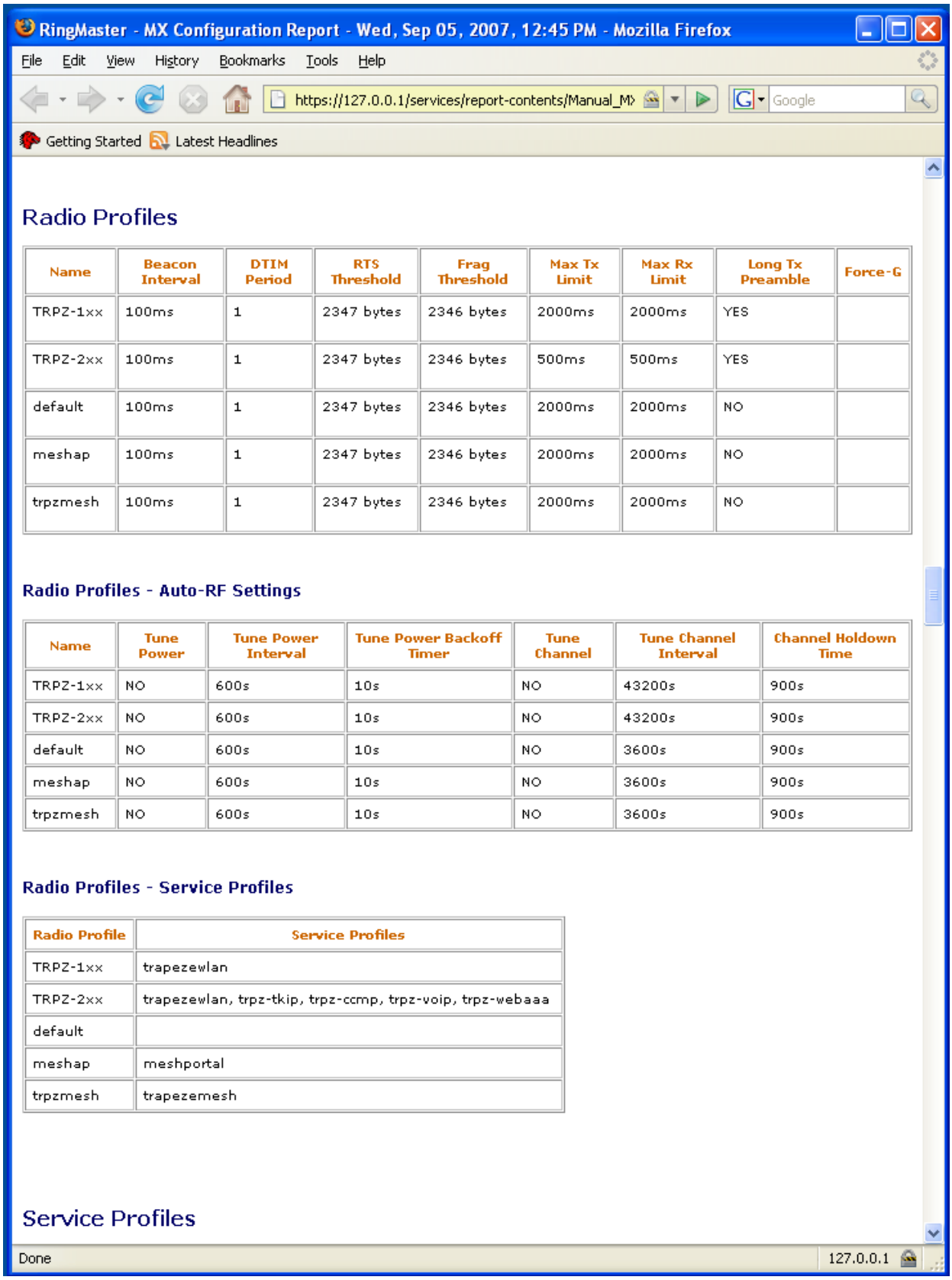

Radio Profiles

Name	Beacon Interval	DTIM Period	RTS Threshold	Frag Threshold	Max Tx Limit	Max Rx Limit	Long Tx Preamble	Force-G
TRPZ-1xx	100ms	1	2347 bytes	2346 bytes	2000ms	2000ms	YES	
TRPZ-2xx	100ms	1	2347 bytes	2346 bytes	500ms	500ms	YES	
default	100ms	1	2347 bytes	2346 bytes	2000ms	2000ms	NO	
meshap	100ms	1	2347 bytes	2346 bytes	2000ms	2000ms	NO	
trpzmesh	100ms	1	2347 bytes	2346 bytes	2000ms	2000ms	NO	

Radio Profiles - Auto-RF Settings

Name	Tune Power	Tune Power Interval	Tune Power Backoff Timer	Tune Channel	Tune Channel Interval	Channel Holdown Time
TRPZ-1xx	NO	600s	10s	NO	43200s	900s
TRPZ-2xx	NO	600s	10s	NO	43200s	900s
default	NO	600s	10s	NO	3600s	900s
meshap	NO	600s	10s	NO	3600s	900s
trpzmesh	NO	600s	10s	NO	3600s	900s

Radio Profiles - Service Profiles

Radio Profile	Service Profiles
TRPZ-1xx	trapezewlan
TRPZ-2xx	trapezewlan, trpz-tkip, trpz-ccmp, trpz-voip, trpz-webaaa
default	
meshap	meshportal
trpzmesh	trapezemesh

Service Profiles

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Table 1– 3 lists the sections in an **MX Configuration** report.

Table 1– 3. MX Configuration Report Sections

Section	Description
System Info	Name, system IP address, software, states of the management services, and states of active RF scanning and countermeasures.
Mobility Domain	System IP address of the seed for the Mobility Domain the switch is in.
10/100 Ports	10/100 Ethernet port settings configured on the switch.
Gig Ports	Gigabit port settings (if applicable) configured on the switch.
VLANs	VLANs configured on the switch.
Spanning Tree	STP settings configured on the switch.
IP Properties	IP settings, including routes and DNS parameters, configured on the switch.
ACLs	Access Control Lists (ACLs) configured on the switch.
APs	Directly connected APs configured on the switch.
Distributed APs	Distributed APs configured on the switch.
Radio Profiles	Radio profiles configured on the switch.
Service Profiles	Service profiles configured on the switch.
802.1X	802.1X parameters configured on the switch.
RADIUS	RADIUS server groups and servers configured on the MX.
Access Rules	AAA rules configured on the switch.
Mobility Profile	Mobility profiles configured on the switch.
Location Policy	Location policies configured on the switch.
Local User DB	Users configured in the local database.

Client Summary Report

The client summary report lists current client sessions.

To generate a client summary report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **Client Summary**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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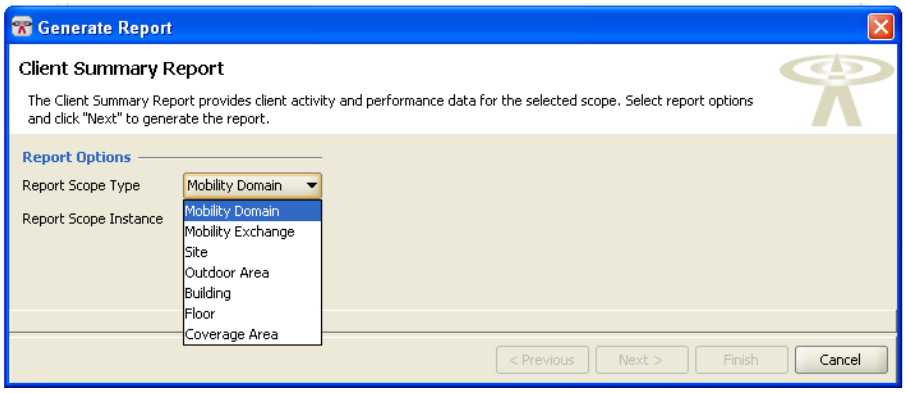
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Client Summary Report** dialog.



5. Select the scope type of the report from the **Report Scope Type** list:
   - **Mobility Domain**
   - **Mobility Exchange**
   - **Site**
   - **Building**
   - **Floor**
   - **Coverage Area**
6. Select the instance for the report. For example, if the scope is **Building**, select the building.
7. Click **Next** to generate the report.
8. When the report is generated, click the report link to view it in the default browser.

The client summary report contains the following sections:

- **Session Summary**
- **Total Num Sessions**
- **Average SNR**
- **Average RSSI**
- **SSID Summary**
- **Access Type Summary**
- **Top Bandwidth Sessions**
- **Low RSSI Sessions**
- **Low SNR Sessions**

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Client Summary Report Changes

In the chart shown below, a column Radio Type has been added:

Top Bandwidth Sessions

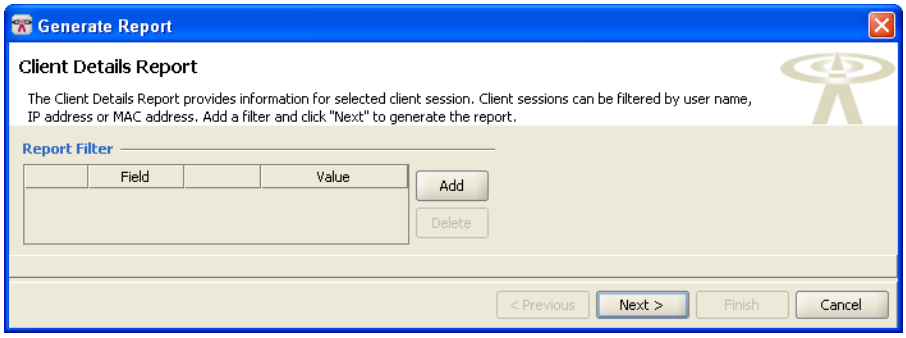
Name	IP Address	MAC Address	Start Time	Location	SSID	Access Type	Bandwidth Usage (Kbps)	SNR	RSSI (dBm)	Radio Type
TRAPEZE\dheckman	172.21.50.69	00:18:02:60:98:c9	Wed, Apr 23, 2008, 11:44 AM	192.168.254.83, DAP 21, Radio 1	alpha-aes	DOT1X	280.5	31	-64	802.11ng
TRAPEZE\lchan	172.21.50.163	00:12:f0:88:be:50	Wed, Apr 23, 2008, 11:41 AM	192.168.254.83, DAP 20, Radio 2	alpha-ccmp	DOT1X	161.6	31	-64	802.11a
TRAPEZE\robm	172.21.50.125	00:14:a5:57:b0:47	Wed, Apr 23, 2008, 11:40 AM	192.168.254.83, DAP 20, Radio 2	alpha-tkip	DOT1X	140.2	31	-64	802.11a
TRAPEZE\daveg	172.21.50.73	00:1e:4c:40:ed:99	Wed, Apr 23, 2008, 11:39 AM	192.168.254.83, DAP 20, Radio 2	alpha-aes	DOT1X	134.6	31	-64	802.11na
TRAPEZE\tschuh	172.21.52.162	00:1c:26:58:b8:f6	Wed, Apr 23, 2008, 11:39 AM	192.168.254.83, DAP 20, Radio 2	alpha-aes	DOT1X	128.5	31	-64	802.11na
TRAPEZE\dwu	172.21.52.144	00:1c:26:ac:f2:91	Wed, Apr 23, 2008, 11:39 AM	192.168.254.83, DAP 21, Radio 1	trapezewlan	DOT1X	128.3	31	-64	802.11g
TRAPEZE\mkeenly	172.21.50.107	00:14:a5:54:1a:b9	Wed, Apr 23, 2008, 11:39 AM	192.168.254.83, DAP 20, Radio 2	trapezewlan	DOT1X	128.1	31	-64	802.11a
TRAPEZE\jnespor	172.21.50.153	00:19:7e:67:a1:88	Wed, Apr 23, 2008, 11:39 AM	192.168.254.83, DAP 22, Radio 2	alpha-aes	DOT1X	128.1	31	-64	802.11a
TRAPEZE\ashah	172.21.50.55	00:14:6c:f3:e5:b0	Wed, Apr 23, 2008, 11:39 AM	192.168.254.83, DAP 21, Radio 1	alpha-aes	DOT1X	127.6	31	-64	802.11ng
TRAPEZE\rrose	172.21.50.58	00:1d:e0:90:58:bb	Wed, Apr 23, 2008, 11:39 AM	192.168.254.83, DAP 23, Radio 2	trapezewlan	DOT1X	127.2	31	-64	802.11a

Client Details Report

The client details report lists details about current client sessions.

To generate a client details report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **Client Details**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Client details Report** dialog.


Generate Report
Client Details Report
The Client Details Report provides information for selected client session. Client sessions can be filtered by user name, IP address or MAC address. Add a filter and click "Next" to generate the report.
Report Filter
Field
Value
Add
Delete
< Previous
Next >
Finish
Cancel

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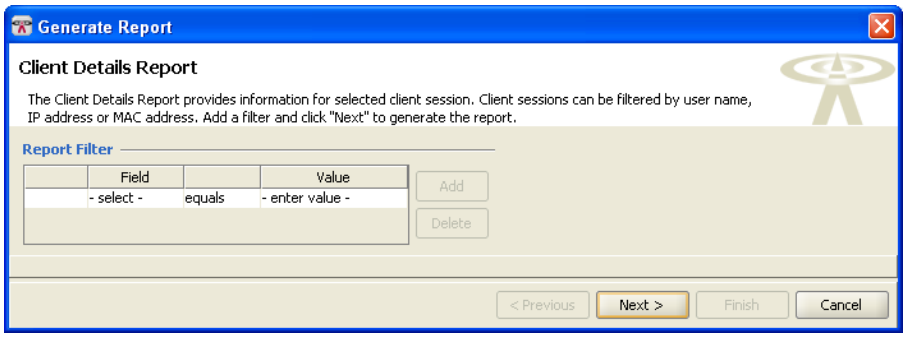
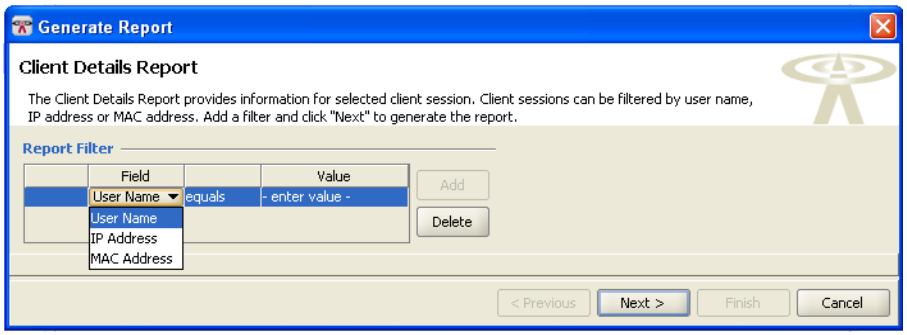
5. Click **Add** to add a report filter. The filter configuration fields are activated.

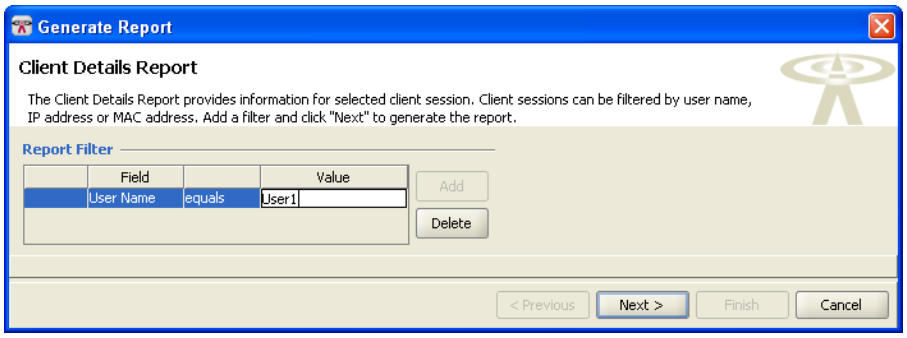

Generate Report
Client Details Report
The Client Details Report provides information for selected client session. Client sessions can be filtered by user name, IP address or MAC address. Add a filter and click "Next" to generate the report.
Report Filter
Field
Value
- select -
equals
- enter value -
Add
Delete
< Previous
Next >
Finish
Cancel

6. Click **Select**, and select one of the following from the list:



- **User Name**
- **IP Address**
- **MAC Address**

7. Click the **Value** field. Erase the text in the field and type a username, IP address, or MAC address of a user, depending on the selection criterion you specified in step 6.



8. Press **Next**.
9. Repeat step 5 through step 8 for each user you want to display details for.

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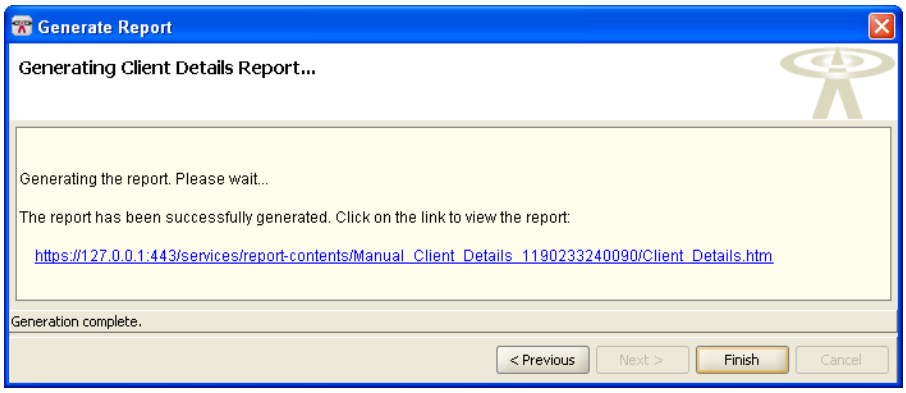
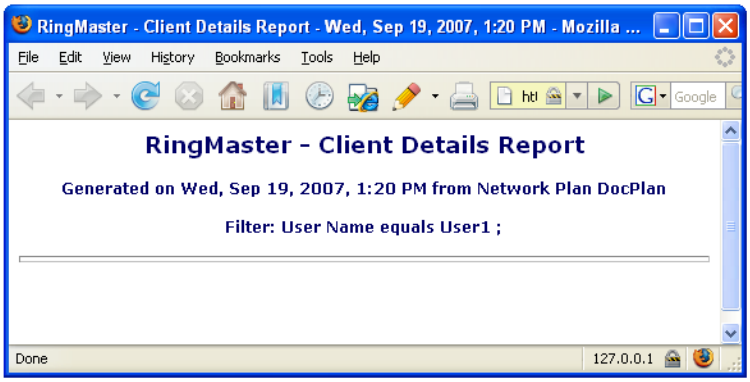
10. Click **Next** to generate the report.



11. When the report is generated, click the report link to view it in the default browser.


RingMaster - Client Details Report - Wed, Sep 19, 2007, 1:20 PM - Mozilla ...
File Edit View History Bookmarks Tools Help
RingMaster - Client Details Report
Generated on Wed, Sep 19, 2007, 1:20 PM from Network Plan DocPlan
Filter: User Name equals User1 ;
Done
127.0.0.1

12. The client details report contains the following sections:
    - **Session Properties**
    - **Location History**
    - **Session Statistics**
    - **Current AP Statistics**
    - **Lifetime AP Statistics**

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Client Detail Report Changes

New columns have been added to this report.

Session Properties

Start Time	Elapsed Time	StateState	NameName	IP Address	SSID	Access Type	VLAN	Auth Server	Auth Protocol
Mon, Apr 21, 2008, 10:20 AM	17 minutes 09 seconds	ACTIVE	TRAPEZE\llee	172.21.50.149	alpha-aes	DOT1X	eng-alpha	172.21.129.173	PASSTHRU

Location History

Start Time	System IP	AP	Radio	Fast Roam
Mon, Apr 21, 2008, 2:00 PM	192.168.254.85	DAP23	2	NO
Mon, Apr 21, 2008, 2:00 PM	192.168.254.83	DAP24	2	NO
Mon, Apr 21, 2008, 11:43 AM	192.168.254.85	DAP20	2	NO
Mon, Apr 21, 2008, 11:26 AM	192.168.254.85	DAP23	2	NO
Mon, Apr 21, 2008, 10:20 AM	192.168.254.85	DAP20	2	NO

Session Statistics

Time	Operational Rate	Bandwidth Usage	RSSI	SNR	Radio Type	Max Channel Width	Max Rx Msdu	Max Rx Mpdu
Mon, Apr 21, 2008, 2:37 PM	1MB/s	12.2B/s	-61	34	802.11a	20MHZ	NONE	NONE

Lifetime AP Statistics

Time	Unicast Bytes In	Multicast Bytes In	Unicast Bytes Out	Encryption Error Bytes	Transmit Timeouts	Tx Peak Mpdu	Rx Peak Msdu	Rx Peak Mpdu
Mon, Apr 21, 2008, 2:37 PM	4085	21493	163334	0	0	0	0	0

Current AP Statistics

Time	Unicast Bytes In	Multicast Bytes In	Unicast Bytes Out	Encryption Error Bytes	Transmit Timeouts	Tx Peak Mpdu	Rx Peak Msdu	Rx Peak Mpdu
Mon, Apr 21, 2008, 2:37 PM	171	0	5030	0	0	0	0	0

Client Errors Report

The client errors report lists error statistics for current client sessions.

To generate a client errors report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **Client Errors**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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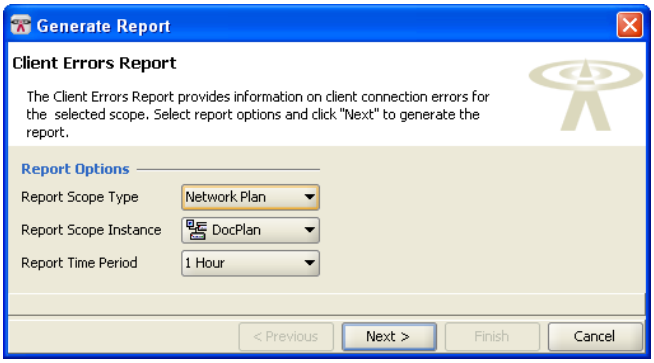
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Client Errors Report** dialog.



5. Select the scope type of the report from the **Report Scope Type** list:
   - **Mobility Domain**
   - **Mobility Exchange**
   - **Site**
   - **Building**
   - **Floor**
   - **Coverage Area**
6. Select the instance for the report. For example, if the scope is **Building**, select the building.
7. Select the time period for the report:
   - **1 Hour**
   - **24 Hours**
   - **7 Days**
   - **30 Days**
8. Click **Next** to generate the report.

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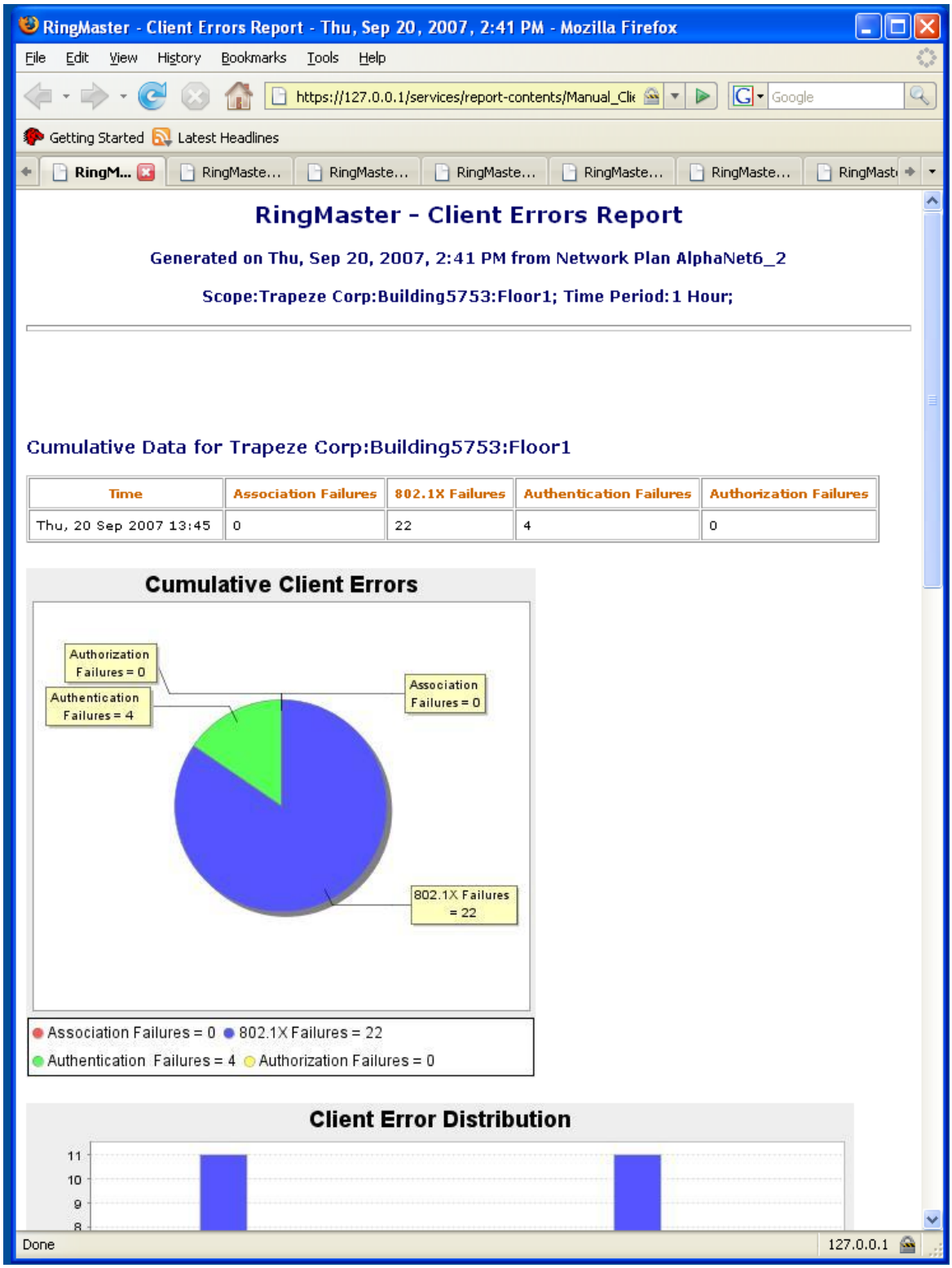
9. Click the report link provided to view it in the default browser.



The client errors report contains the following sections:

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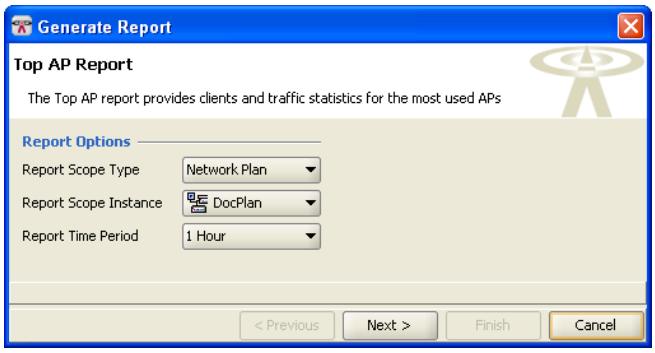
- **Cumulative errors for the scope of the report**
- **Client errors on individual MXs**

Top APs

To generate a **Top APs** report:

1. Select the **Reports** Navigation Bar button.
2. From the **Report Types** list, select **Top APs**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Top AP Report** dialog.



5. Select the scope type of the report from the **Report Options** list:
   - **Report Scope Type**
     - **Network Plan**
     - **Mobility Domain**
     - **Mobility Exchange**
     - **Site**
     - **Outdoor Area**
     - **Floor**
   - **Report Scope Instance**
   - **Report Time Period**

SmartPass Accounting Summary

To generate a **SmartPass Accounting Summary** report:

1. Select the **Reports** Navigation Bar button.
2. From the **Report Types** list, select **SmartPass Accounting Summary**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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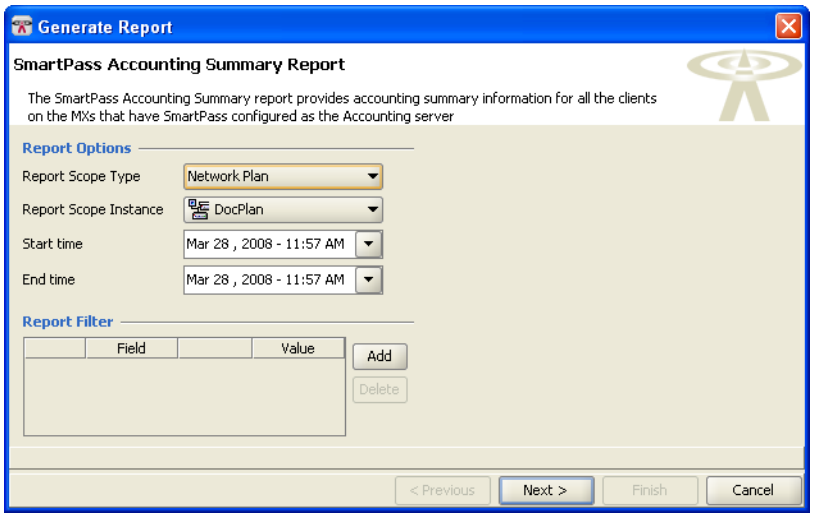
4. To generate a new report, click **Generate**.



Select parameters for the report from the **Report Options** list:

- **Report Scope Type**
  - **Network Plan**
  - **Mobility Domain**
  - **Mobility Exchange**
- **Report Scope Instance**
- **Report Time Period**

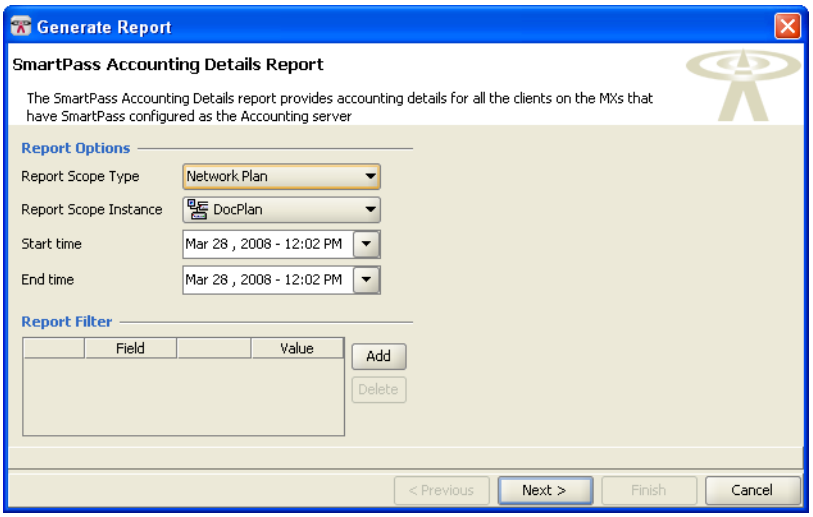
Add a Report Filter if desired.

5. Click **Next**. The report is generated.

SmartPass Accounting Details

To generate a **SmartPass Accounting Details** report:

1. Select the **Reports** Navigation Bar button.
2. From the **Report Types** list, select **SmartPass Accounting Details.**
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click **Generate**.



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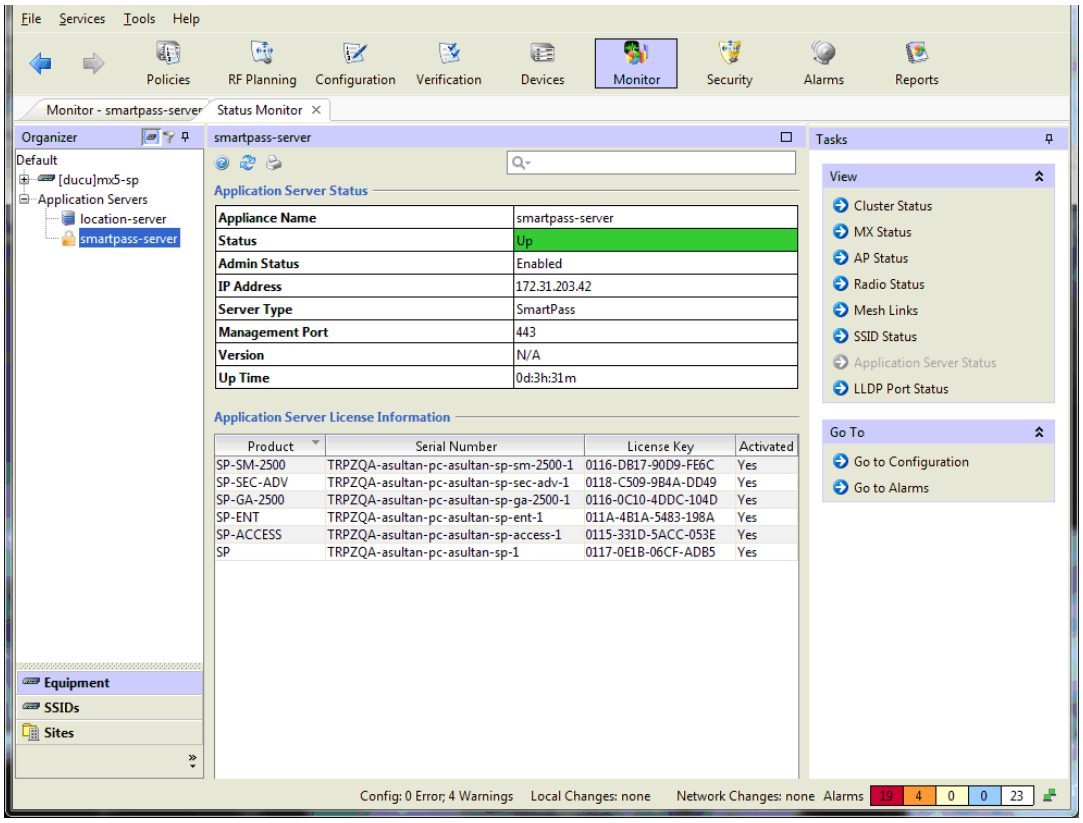
5. Select parameters for the report from the **Report Options** list:
   - **Report Scope Type**
     - **Network Plan**
     - **Mobility Domain**
     - **Mobility Exchange**
   - **Report Scope Instance**
   - **Report Time Period**

   Add a Report Filter if desired.
6. Click **Next**. The report is generated.

SmartPass as an Integrated Application Server

SmartPass is now included as an application server under **Application Servers** in the Monitoring section of RingMaster. Selecting a SmartPass server displays server attributes and SmartPass license information. For SmartPass servers of versions lower than **Uptime**, **Version**, and **License Information** information is not available.



The following tasks are available after selecting a SmartPass server Organizer panel:

- Session Monitoring
- Accounting History
- Clients by Time
- SmartPass Accounting Summary report
- SmartPass Accounting Details report
- SmartPass SMS/Email Notifications report

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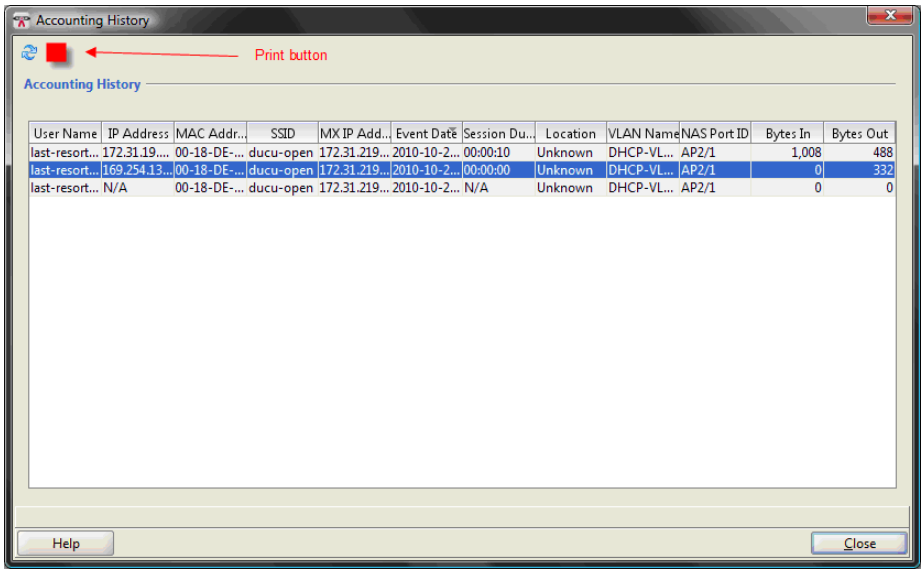
Accounting History Data

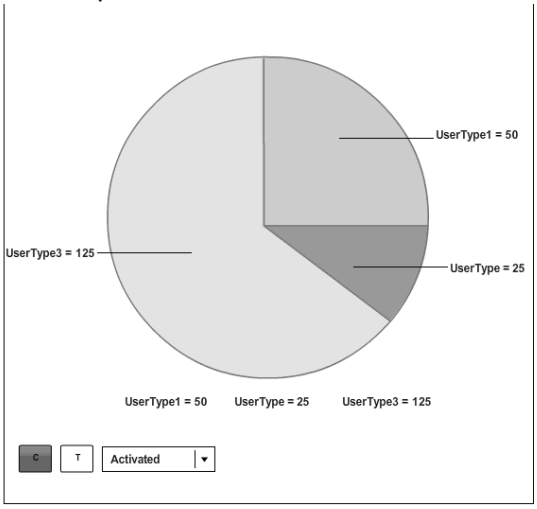
RingMaster can display and print the accounting history data polled from all the configured (and managed) SmartPass servers. You must first supply information for the following fields used for filtering data:

- Username
- MAC address
- Date range (start date & end date)
- SSID name
- Location
- Quantity of bytes in/out
- Filter by throughput



SmartPass Configured User State Display

The **Types** task under **Clients by User** launches a new pop-up window that contains a chart representing the distributed state of the configured users per user type. The data is polled from all the managed SmartPass servers and shown as one result. SmartPass configured users can exist in different states- **Activated**, **Expired**, **Unauthenticated** or **Locked**. RingMaster states can be chosen from a drop down list. You can also switch the results to be displayed in a table.



User Type	Client Count
usr-typ1	12
usr-typ2	9
usr-typ13	10

C T Expired

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SmartPass New Reports

SMS/Email Notifications

This report displays the number of SMSs and email notifications sent per user type. The data is polled from all configured and managed SmartPass severs in RingMaster, version or above. A message displays if no SmartPass servers are present in the network plan. If the report is run from the Monitoring panel and the selected context is a single SmartPass server, the the data is polled only from that server.

Accounting Summary/Details

The SmartPass Accounting Summary/Details report has been enhanced to display the aggregated data from all configured and managed SmartPass servers.

Client Details

This report can be enhanced to show if the client was authenticated by a SmartPass server and the user type. This report includes voice data. If the report is run from the Monitoring panel and the selected context is a single SmartPass server, the data is polled only from that server.

Call Summary/Details

The calls data is polled from all configured (and managed) servers and aggregated in the same result.

SmartPass Access Control

If access control is enabled on RingMster, only users who have administrative privileges or configuration/monitoring privileges at network plan level are able to manage/monitor a SmartPass server. During the process of uploading a SmartPass server in RingMaster, a check for administrative privileges prevents any management activity, if the credentials provided by the user do not correspond to an administrator account. The same thing happens when attempting to manage an unmanaged server through the **Edit SmartPass Server** task, or when synchronizing a managed server through the Synchronize task.

If access control is enabled on SmartPass, but the user and the password configured in RingMaster for a managed SmartPass server does not correspond to an administrator account (credentials may have changed since the moment of the upload), the Synchronize and Deploy operations fail. User names and password are always specified in the RingMaster request, so SmartPass is able to check if the credentials correspond to an administrator account and return an error response if they belong to a provisioning or self-signed account.

Network Usage (Port Traffic) Report

The network usage report lists network usage statistics.

To generate a network usage report:

1. Select the **Reports** Navigation Bar button.
2. From the **Report Types** list, select **Network Usage (Port Traffic)**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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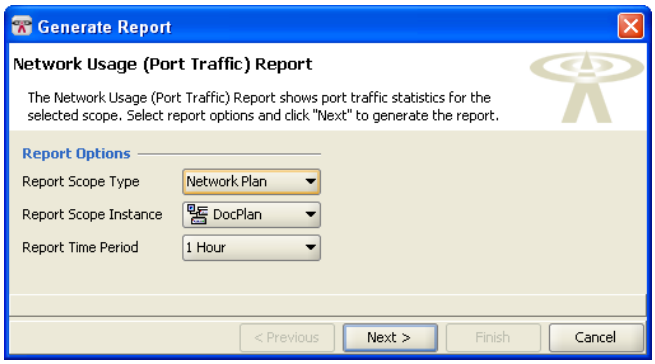
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Network Usage (Port Traffic) Report** dialog.


Generate Report
Network Usage (Port Traffic) Report
The Network Usage (Port Traffic) Report shows port traffic statistics for the selected scope. Select report options and click "Next" to generate the report.
Report Options
Report Scope Type
Network Plan
Report Scope Instance
DocPlan
Report Time Period
1 Hour
< Previous
Next >
Finish
Cancel

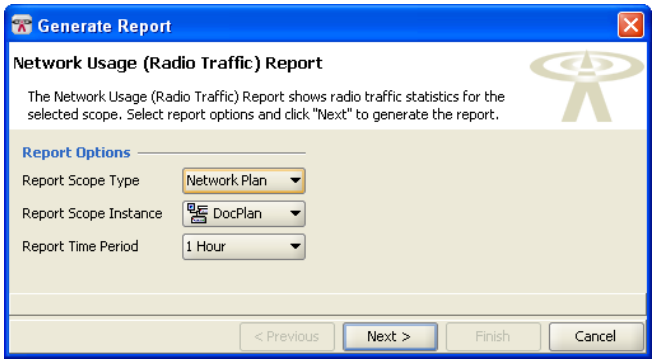
5. Select the scope type of the report from the **Report Scope Type** list:
   - **Network Plan**
   - **Mobility Domain**
   - **Mobility Exchange**
6. Select the **Report Scope Instance** for which you want the report. For example, if the scope is **Mobility Exchange**, select an MX.
7. Select the Report Time Period for the report:
   - **1 Hour**
   - **24 Hours**
   - **7 Days**
   - **30 Days**
8. Click **Next** to generate the report.
9. When the report is generated, click the report link to view it in the default browser.

Network Usage (Radio Traffic) Report

The traffic report shows traffic statistics and trends.

To generate a traffic report:

1. Select the **Reports** Navigation Bar button.
2. From the Report Types list, select **Network Usage (Radio Traffic)**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Network Usage (Radio Traffic) Report** dialog.


Generate Report
Network Usage (Radio Traffic) Report
The Network Usage (Radio Traffic) Report shows radio traffic statistics for the selected scope. Select report options and click "Next" to generate the report.
Report Options
Report Scope Type
Network Plan
Report Scope Instance
DocPlan
Report Time Period
1 Hour
< Previous
Next >
Finish
Cancel

5. Select the scope type of the report from the **Report Scope Type** list:

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- **Network Plan**
- **Mobility Domain**
- **Site**
- **Building**
- **Floor**
- **Distributed AP**
- **AP**
- **Radio**

6. Select the instance for which you want the report. For example, if the scope is Building, select the building.
7. Select the time period for the report:
   - **1 Hour**
   - **24 Hours**
   - **7 Days**
   - **30 Days**
8. Click **Next** to generate the report.
9. When the report is generated, click the report link to view it in the default browser.

Network Usage (Radio Traffic) Report Changes

New columns have been added to this report

RingMaster - Network Usage (Radio Traffic) Report

Generated on Thu, Apr 10, 2008, 11:44 AM from Network Plan alphanet_6.2.3

Scope:alphanet_6.2.3; Time Period:1 Hour;

Cumulative Data for alphanet_6.2.3

Time	Number of Clients	Throughput	Multicast Bytes Sent	Unicast Bytes Sent	Unicast Bytes Received	Last Tx Rate (kbytes/sec)
Thu, 10 Apr 2008 10:45	12	1814339 B/s	13500729028	2105826154	114758254189	170000

RF Summary Report

The RF summary report lists summary RF statistics.

To generate an RF summary report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **RF Summary**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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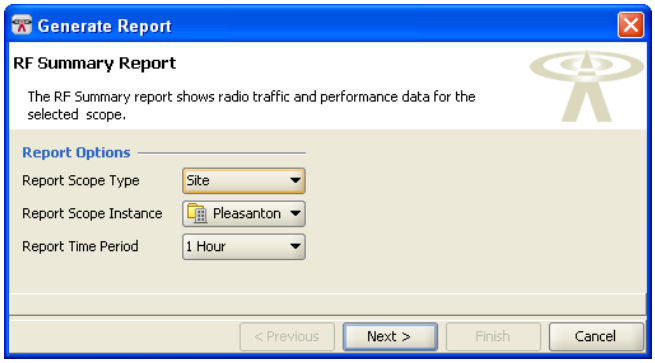
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > RF Summary Report** dialog.



5. Select the scope of the report from the Report Scope Type list:
   - **Mobility Domain**
   - **Mobility Exchange**
   - **Site**
   - **Building**
   - **Floor**
   - **Coverage Area**
6. Select the instance for which you want the report. For example, if the scope is Building, select the building.
7. Select the time period for the report:
   - **1 Hour**
   - **24 Hours**
   - **7 Days**
   - **30 Days**
8. Click **Next** to generate the report.
9. When the report is generated, click the report link to view it in the default browser. The RF summary report contains the following sections:
   - **Cumulative data for the scope of the report**
   - **Detailed data for each MX within the scope of the report**

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RF Summary Report Changes

New columns have been added to this report:

RingMaster - RF Summary Report

Generated on Fri, Apr 11, 2008, 10:48 AM from Network Plan alphanet_6.2.3

Scope:Trapeze; Time Period:7 Days;

Cumulative Data for Trapeze

Time	Last Tx Rate (kbytes/sec)	SNR	Throughput (bytes/sec)	Authorized Clients	Client Failures	RF Interference	PHY Errors	Re-transmits	Noise Floor (dBm)
Fri, 11 Apr 2008 10:00	88000	9	220934	5	23	0	14196	4854385	-28

Building1 - Details

Time	Last Tx Rate (kbytes/sec)	SNR	Throughput (bytes/sec)	Authorized Clients	Client Failures	RF Interference	PHY Errors	Re-transmits	Noise Floor (dBm)
Thu, 3 Apr 2008 18:00	150000	7	208469	22	26	0	184432	36553908	-24
Thu, 3 Apr 2008 20:00	62000	5	229109	6	3	0	189687	38692407	-24
Thu, 3 Apr 2008 22:00	80000	5	260928	1	45	0	191385	40145081	-24
Wed, 9 Apr 2008 16:00	70000	8	353292	8	10	0	344242	27590780	-28
Wed, 9 Apr 2008 18:00	139000	9	1234363	9	4	0	364156	30544895	-28
Wed, 9 Apr 2008 20:00	100000	8	1801376	2	0	0	375906	33008848	-28
Wed, 9 Apr 2008 22:00	88000	8	1825734	1	0	0	385473	35353775	-28
Thu, 10 Apr 2008 00:00	88000	8	1930033	1	0	0	396824	37649074	-28
Thu, 10 Apr 2008 02:00	154000	8	1900126	1	4	0	408205	39883415	-28
Thu, 10 Apr 2008 04:00	196000	8	1947705	0	26	0	414135	42068798	-28
Thu, 10 Apr 2008 06:00	136000	8	1910477	0	21	0	415946	44244440	-28
Thu, 10 Apr 2008 08:00	88000	8	1915611	0	25	0	417800	46493570	-28
Thu, 10 Apr 2008 10:00	156000	8	1887900	2	17	0	432867	48934932	-28
Thu, 10 Apr 2008 12:00	39252000	9	1782649	8	8	0	455636	51705791	-28
Thu, 10 Apr 2008 14:00	140000	9	1746874	5	16	0	472372	54486880	-28
Thu, 10 Apr 2008 16:00	39081000	8	340970	5	8	0	493399	57541647	-28
Thu, 10 Apr 2008 18:00	52082000	7	259032	4	34	0	511873	60067769	-28
Thu, 10 Apr 2008 20:00	110000	7	239956	2	16	0	530277	62267878	-28
Thu, 10 Apr 2008 22:00	106000	7	218680	2	9	0	548701	64317697	-28
Fri, 11 Apr 2008 00:00	13034000	6	212836	3	23	0	567812	66398856	-28
Fri, 11 Apr 2008 02:00	52000	6	210525	3	13	0	586554	68421500	-28
Fri, 11 Apr 2008 04:00	64000	11	137489472	3	12	0	674868	110522379	-45
Fri, 11 Apr 2008 06:00	24000	24	85995	0	5	0	215	508098	-96
Fri, 11 Apr 2008 08:00	40000	7	176502	1	14	0	3558	2206248	-28
Fri, 11 Apr 2008 10:00	88000	9	220934	5	23	0	14196	4854385	-28

Radio Details Report

The radio details report lists details about an individual radio.

To generate a radio details report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **Radio Details**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > RF Details Report** dialog.

5. Select a Report Scope Type in the pull-down.
6. Select a Report Scope Instance in the pull-down.
7. Select the time period for the report:
   - **1 Hour**
   - **24 Hours**
   - **7 Days**
   - **30 Days**
8. Click **Next** to generate the report.
9. When the report is generated, click the report link to view it in the default browser.

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Radio Detail Report Changes

New columns have been added to this report

RingMaster - Radio Details Report

Generated on Fri, Apr 11, 2008, 10:48 AM from Network Plan alphanet_6.2.3

Scope:alpha_216:MP-NewTAC:Radio2; Time Period:24 Hours;

MP-NewTAC:Radio2 - Details

Time	Last Tx Rate (kbytes/sec)	SNR	Throughput (bytes/sec)	Authorized Clients	Client Failures	RF Interference	PHY Errors	Re-transmits	Noise Floor (dBm)
Thu, 10 Apr 2008 11:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 12:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 13:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 14:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 15:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 16:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 17:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 18:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 19:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 20:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 21:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 22:00	0	0	0	0	0	0	0	0	0
Thu, 10 Apr 2008 23:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 00:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 01:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 02:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 03:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 04:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 07:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 08:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 09:00	0	0	0	0	0	0	0	0	0
Fri, 11 Apr 2008 10:00	0	0	0	0	0	0	0	0	0

Rogue Summary Report

The rogue summary report lists information about rogues.

To generate a rogue summary report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **Rogue Summary**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.

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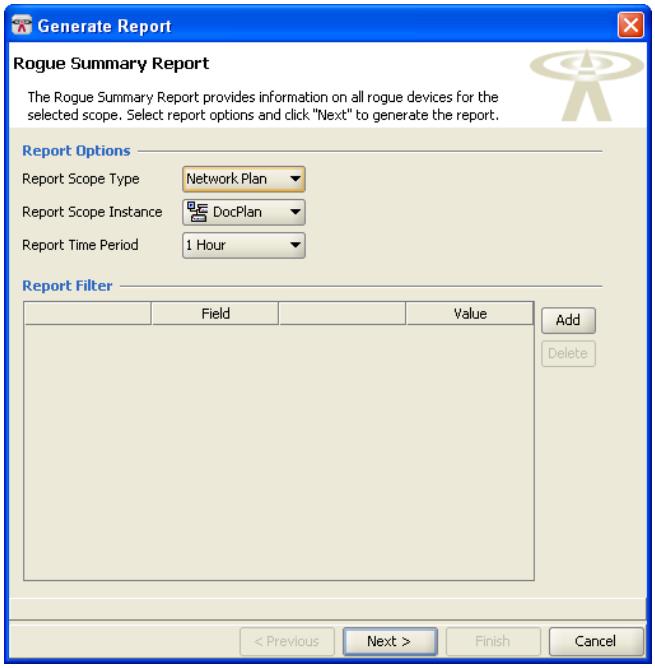
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Rogue Summary Report** dialog.



5. Select the scope type of the report from the Report Scope Type list:
   - **Mobility Domain**
   - **Site**
   - **Building**
   - **Floor**
6. Select the instance for which you want the report. For example, if the scope is Building, select the building.
7. Select the time period for the report:
   - **1 Hour**
   - **24 Hours**
   - **7 Days**
   - **30 Days**
8. To specify the rogue type, click on the Value field in the Report Filter area of the dialog, and select one of the following from the list:
   - **Rogue**
   - **Interfering**
   - **Ad-hoc**
   - **All** (This option displays all three types: rogue, interfering, and ad-hoc.)

   The default is Rogue.
9. Click **Next** to generate the report.

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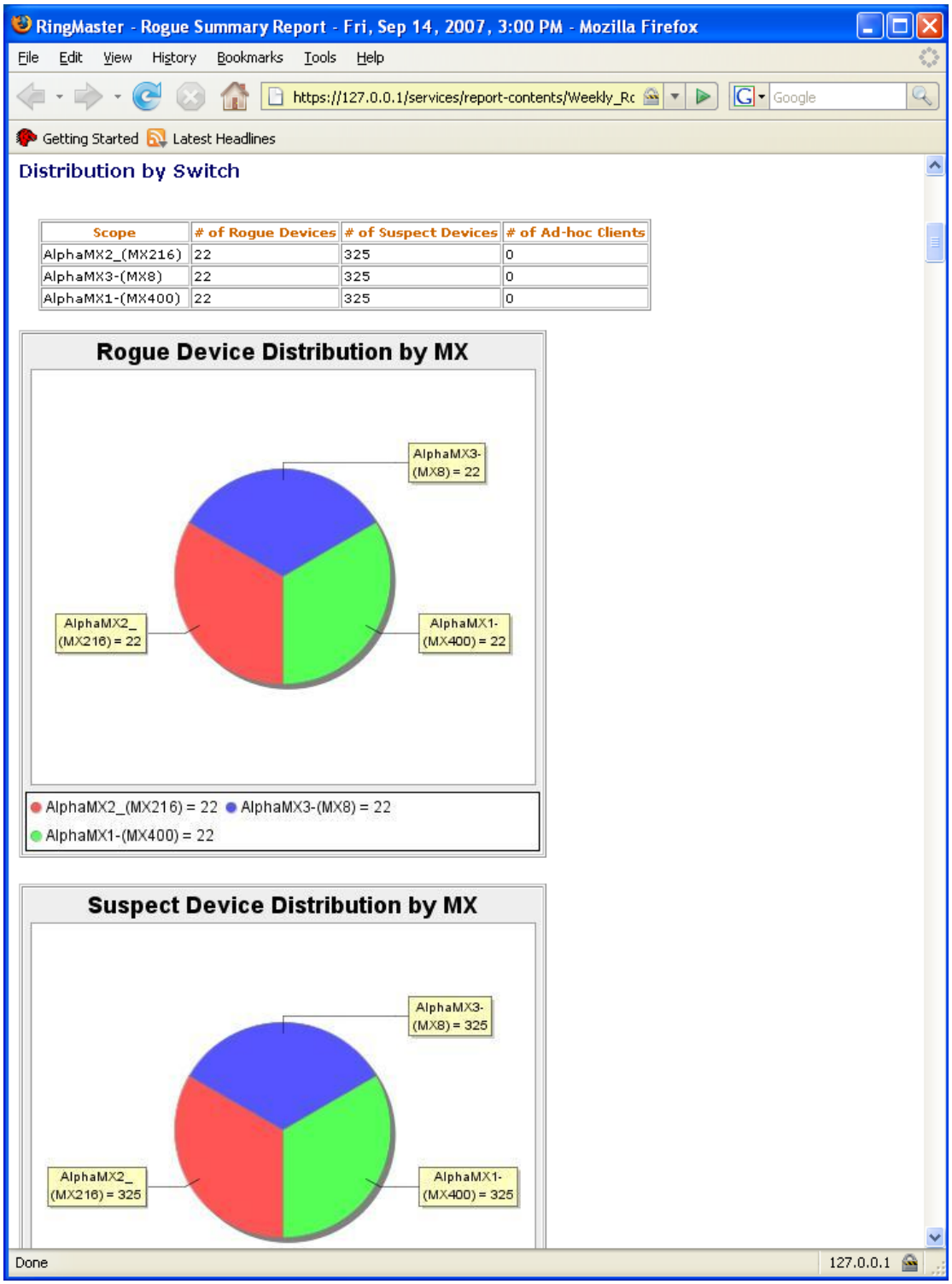
10. When the report is generated, click the report link to view it in the default browser.



The report lists the BSSIDs of the rogues detected by each MX. The report also shows graphs of the distribution of rogues on the MXs, and of trend data.

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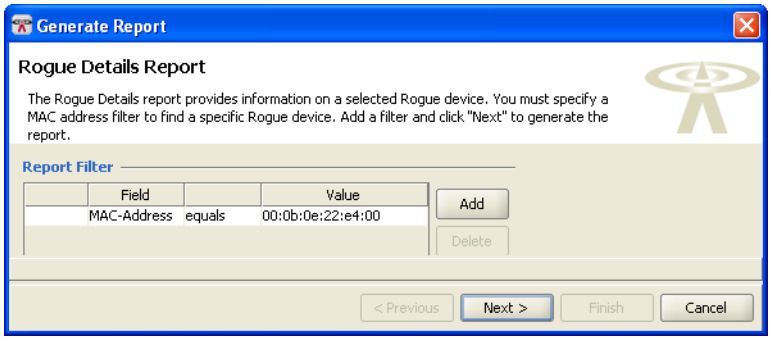
Rogue Details Report

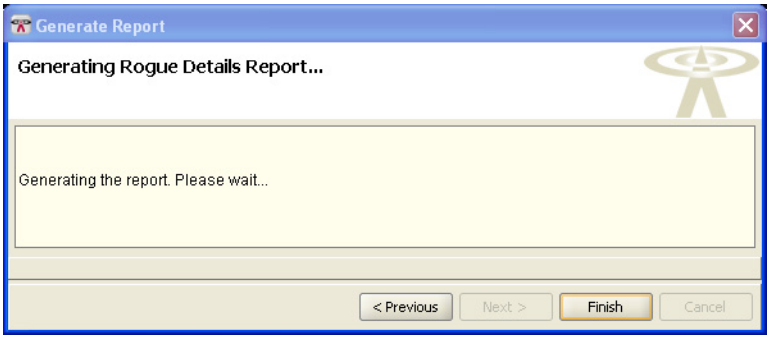
The rogue details report lists detailed information about rogue devices.

To generate a rogue details report:

1. Select the **Reports** Navigation Bar button.
2. In the **Report Types** list, select **Rogue Details**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Rogue Details Report** dialog.



5. Click **Add** to add a report filter. The filter configuration fields are activated.
6. Click on the **Select** field, and select **MAC Address**.
7. Click on the **Value** field. Erase the text in the field and type the BSSID of the rogue.
8. Press **Next** to complete the filter.
9. Repeat step 5 through step 8 to display details for each user.
10. Click **Next** to generate the report.You will see a progress dialog:



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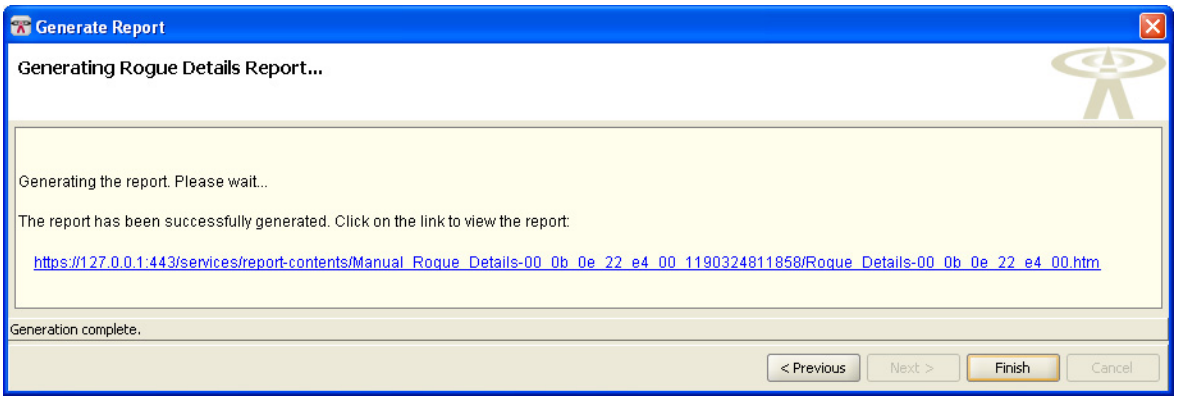
11. When the report is generated, a dialog appears that has a link to the report.



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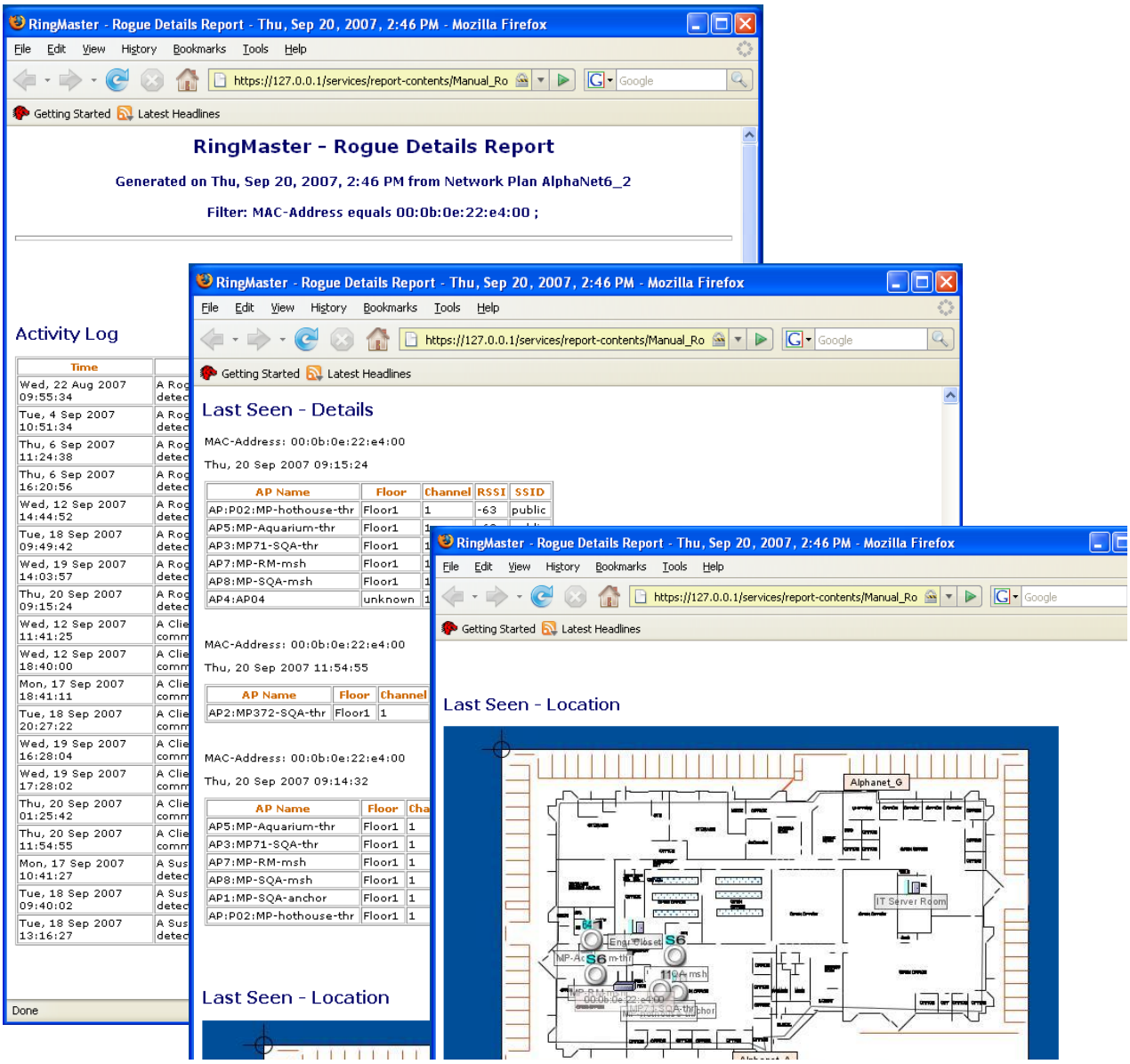
Click the report link to view the report in the default browser. The illustration below shows three sections of the report as it is scrolled to show all features.


RingMaster - Rogue Details Report - Thu, Sep 20, 2007, 2:46 PM - Mozilla Firefox
RingMaster - Rogue Details Report
Generated on Thu, Sep 20, 2007, 2:46 PM from Network Plan AlphaNet6_2
Filter: MAC-Address equals 00:0b:0e:22:e4:00 ;
Activity Log
Last Seen - Details
MAC-Address: 00:0b:0e:22:e4:00
Thu, 20 Sep 2007 09:15:24
Last Seen - Location
Alphanet_G
IT Server Room

Alarm Summary Report

The alarm summary report provides a summary of alarms.

To generate an alarm summary report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **Alarm Summary**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Reports** dialog.

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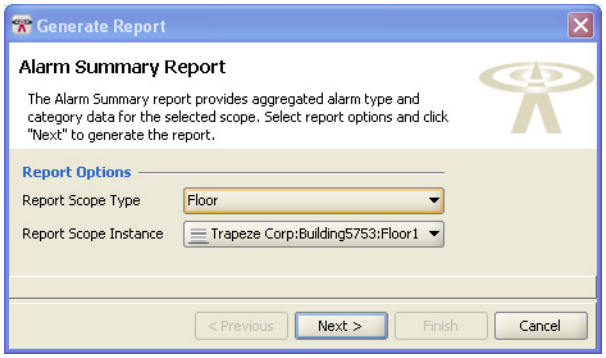
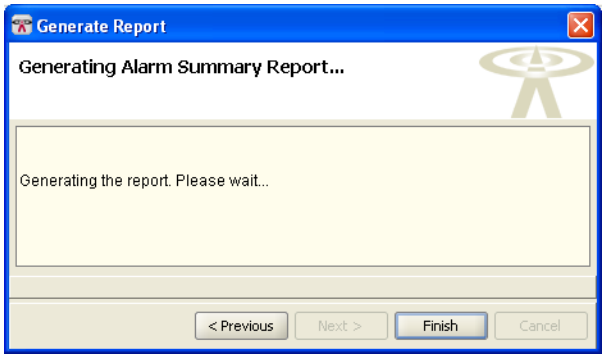
5. Select the scope type of the report from the **Report Scope Type** list:


Generate Report
Alarm Summary Report
The Alarm Summary report provides aggregated alarm type and category data for the selected scope. Select report options and click "Next" to generate the report.
Report Options
Report Scope Type
Floor
Report Scope Instance
Trapeze Corp:Building5753:Floor1
< Previous
Next >
Finish
Cancel

   - **Network Plan**
   - **Mobility Domain**
   - **Site**
   - **Building**
   - **Floor**
6. Select the instance for which you want the report. For example, if the scope is **Building**, select the building.
7. Click **Next** to generate the report. You will see a dialog while the report is generated:



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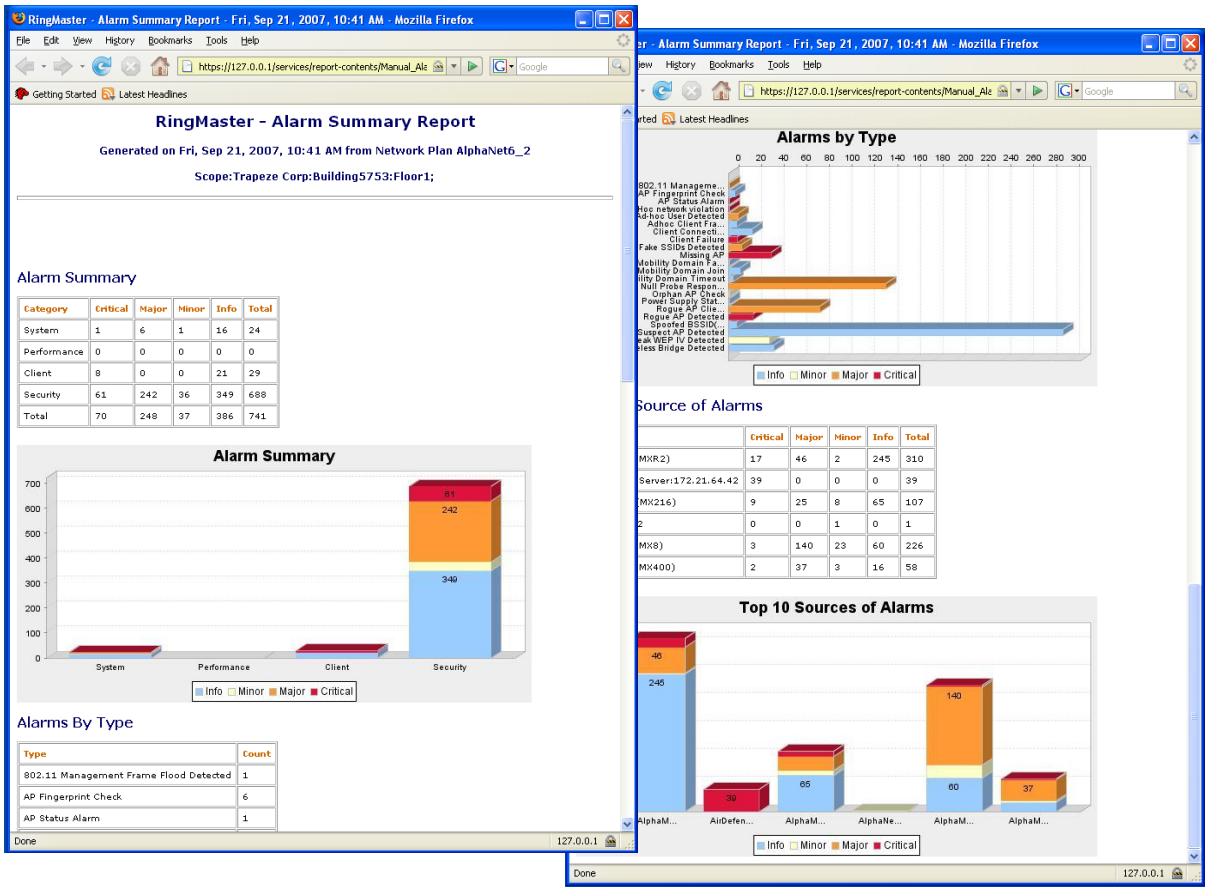
8. When the report is generated, click the report link to view it in the default browser.


RingMaster - Alarm Summary Report - Fri, Sep 21, 2007, 10:41 AM - Mozilla Firefox
RingMaster - Alarm Summary Report
Generated on Fri, Sep 21, 2007, 10:41 AM from Network Plan AlphaNet6_2
Scope:Trapeze Corp:Building5753:Floor1;
Alarm Summary
Alarm Summary
Alarms By Type
Alarms by Type
Source of Alarms
Top 10 Sources of Alarms
Info Minor Major Critical

Alarm History Report

The alarm history report provides a history of alarms.

To retrieve fault history:

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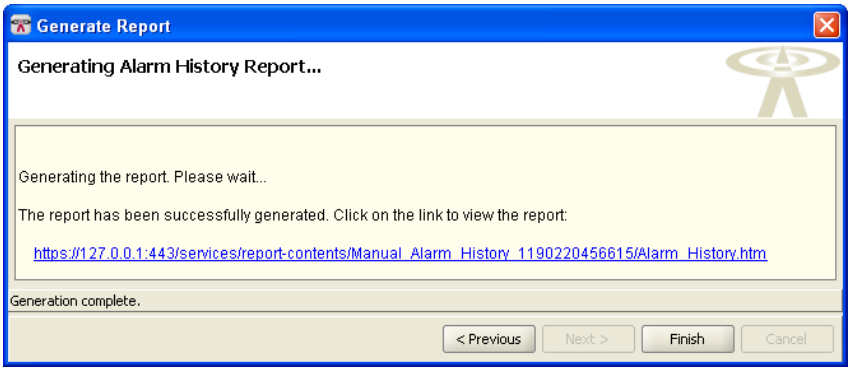
1. Click **Alarm History** in the **Tasks** panel under **Reports**.

2. *RingMaster* displays the **Alarm History** dialog box. You can sort history using any of the following fields:
   - **Report Scope Type**
   - **Report Scope Instance**
   - **Start date**
   - **Start time**
   - **End date**
   - **End time**

   Click **Next** to see the **Generate Report** dialog, which gives you a link to the final report:



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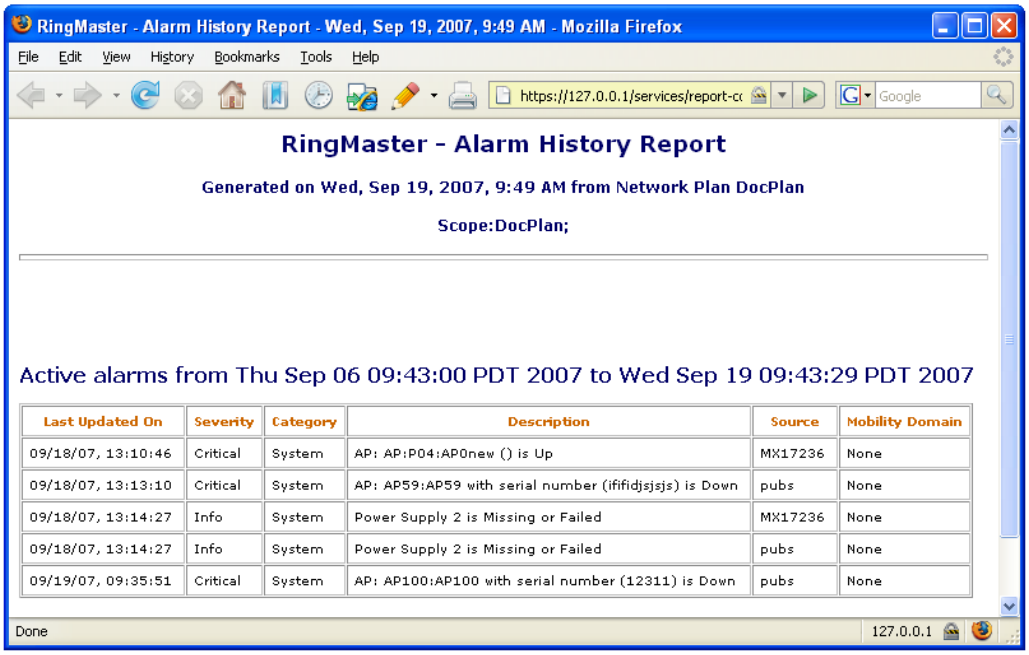
An example report looks like this:

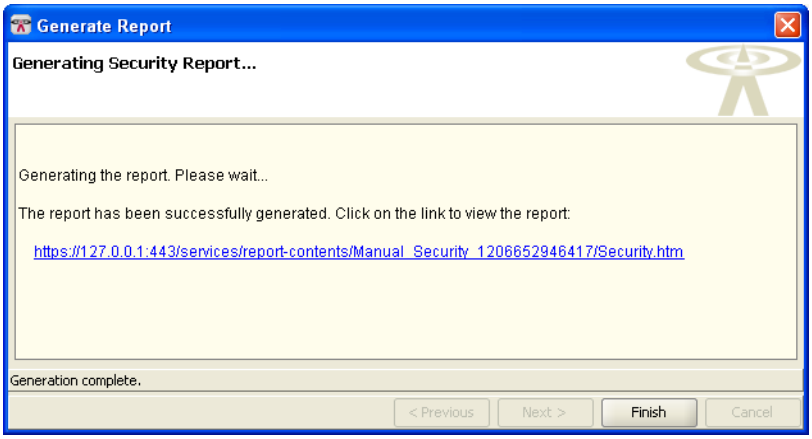

RingMaster - Alarm History Report - Wed, Sep 19, 2007, 9:49 AM - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://127.0.0.1/services/report-c
Google
RingMaster - Alarm History Report
Generated on Wed, Sep 19, 2007, 9:49 AM from Network Plan DocPlan
Scope:DocPlan;
Active alarms from Thu Sep 06 09:43:00 PDT 2007 to Wed Sep 19 09:43:29 PDT 2007
Last Updated On | Severity | Category | Description | Source | Mobility Domain
09/18/07, 13:10:46 | Critical | System | AP: AP:P04:APOnew () is Up | MX17236 | None
09/18/07, 13:13:10 | Critical | System | AP: AP59:AP59 with serial number (ifififdjsjsjs) is Down | pubs | None
09/18/07, 13:14:27 | Info | System | Power Supply 2 is Missing or Failed | MX17236 | None
09/18/07, 13:14:27 | Info | System | Power Supply 2 is Missing or Failed | pubs | None
09/19/07, 09:35:51 | Critical | System | AP: AP100:AP100 with serial number (12311) is Down | pubs | None
Done
127.0.0.1

Security Report

The security alarm report provides information about security alarms.

To generate a security alarm report:

1. Select the **Reports** Navigation Bar button.
2. In the Report Types list, select **Security**.
3. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Generating Security Report...** dialog.



4. When the report is generated, click the report link to view it in the default browser.

Client OUI Report

The client OUI report provides information about client-related alarms.

To generate a Client OUI report:

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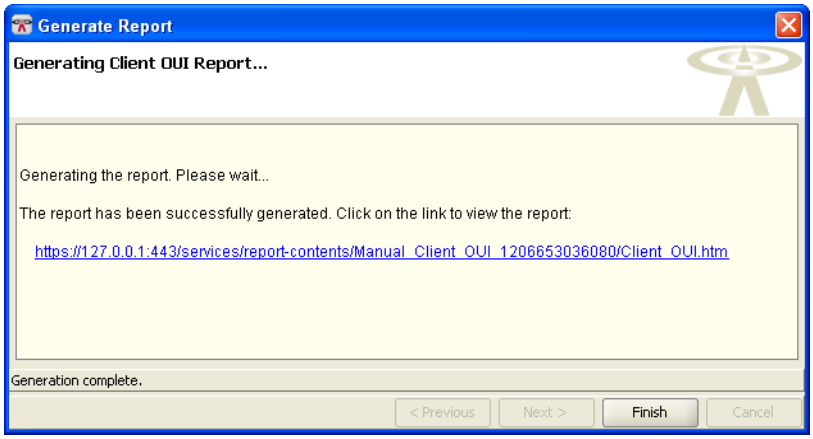
1. Select the **Reports** Navigation Bar button.
2. In the **Report Types** list, select **Client OUI**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Generating Client OUI Report...** dialog.



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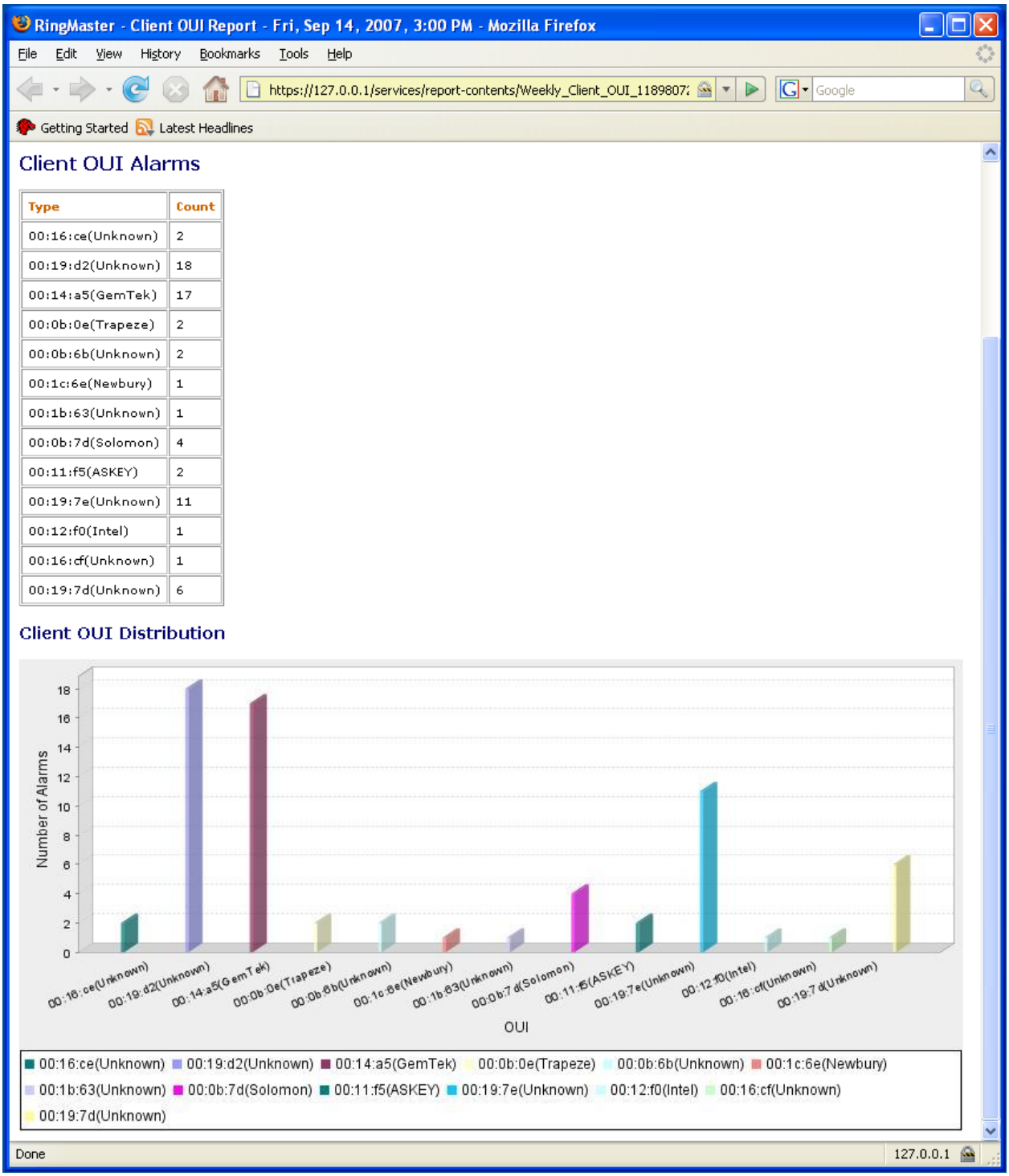
5. When the report is generated, click the report link to view it in the default browser.



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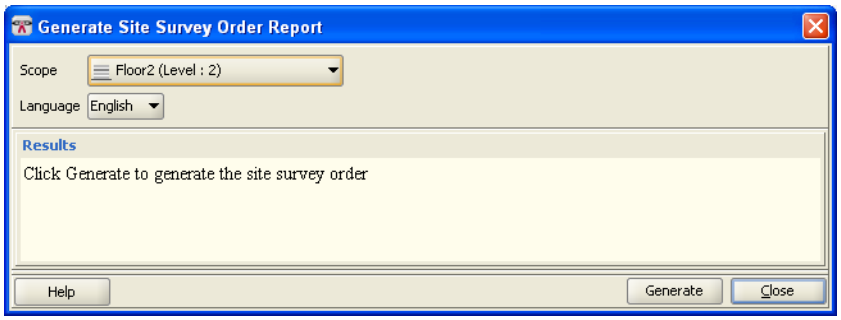
Site Survey Order

The site survey order contains the locations and MAC addresses of the line-of-site (LOS) points for use when conducting a site survey, and also provides a GIF image of the floor.

For a site survey order to be meaningful, you must specify the line-of-site (LOS) points first. (See “Importing RF Obstacle Data from a Site Survey” on page 82.)

To generate a site survey order:

1. Select the **Reports** Navigation Bar button.
2. In the **Report Types** list, select **Site Survey Order**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Report > Generate Site Survey Order Report** dialog.



5. Select the scope for the work order. You can select the network plan, a site, a building, or an individual floor.
6. Select the language:
   - **English**
   - **German**
7. Click **Generate** to generate the report.
8. When the report is generated, click the report link to view it in the default browser.
9. Optionally, select the floor.
10. Click **View Site Survey Order**. The site survey order appears. LOS point information for the selected floor is displayed. Scroll down to view the MAC address assignments for the LOS points. Use the instructions in the Ekahau Site Survey Initial Setup section of the work order to set up the survey.

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Work Order

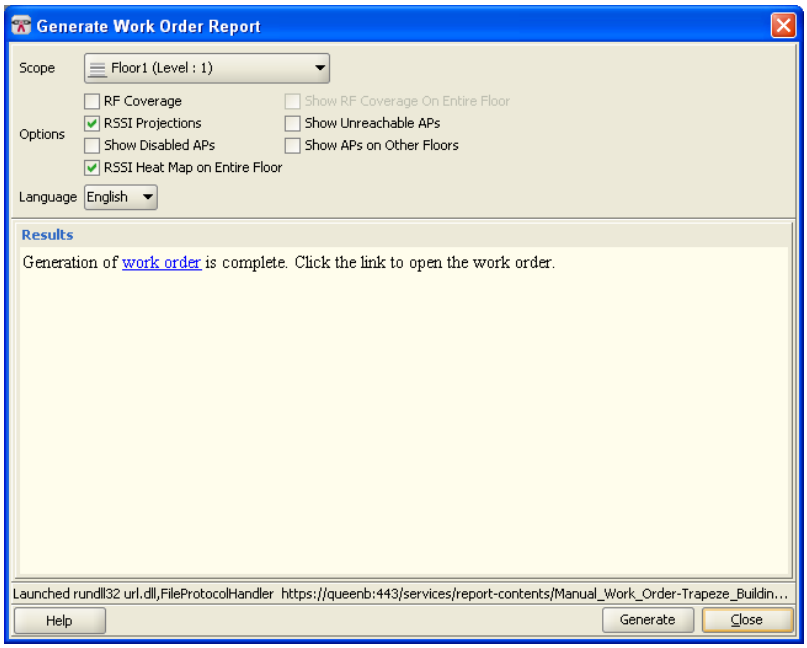
A work order provides all of the necessary information for the physical installation of the Trapeze Mobility System. A work order shows where the AP access points should be installed, MX initial setup configuration information, and projected RSSI information that is useful when verifying the installation.

A work order has meaning only after adding planning information. (See the publication *RingMaster Planning Guide*.)

Work Order and Rogue detail reports can be only generated and viewed. These reports do not go into the report list in the main panel.

To generate a work order:

1. Select the **Reports** Navigation Bar button.
2. In the **Report Types** list, select **Work Order**.
3. To view an existing report, click on its name and select **View** in the **Tasks** panel.
4. To generate a new report, click the **Generate** item from the **Tasks** panel to display the **Generate Work Order Report** dialog.



5. Select the scope for the work order. You can select the network plan, a site, a building, or an individual floor.
6. Select the options you want to use for the report:
   - **RF Coverage —** if selected the following options are available:
     - **Show RF Coverage On Entire Floor**
   - **RSSI Projections** — if selected the following options are available:
     - **Show Disabled APs**
     - **Show RF Coverage On Entire Floor**
     - **Show Unreachable APs**
   - **Show APs on Other Floors**
   - **RSSI Heat Map on Entire Floor**
7. Select the language:
   - **English**
   - **German**

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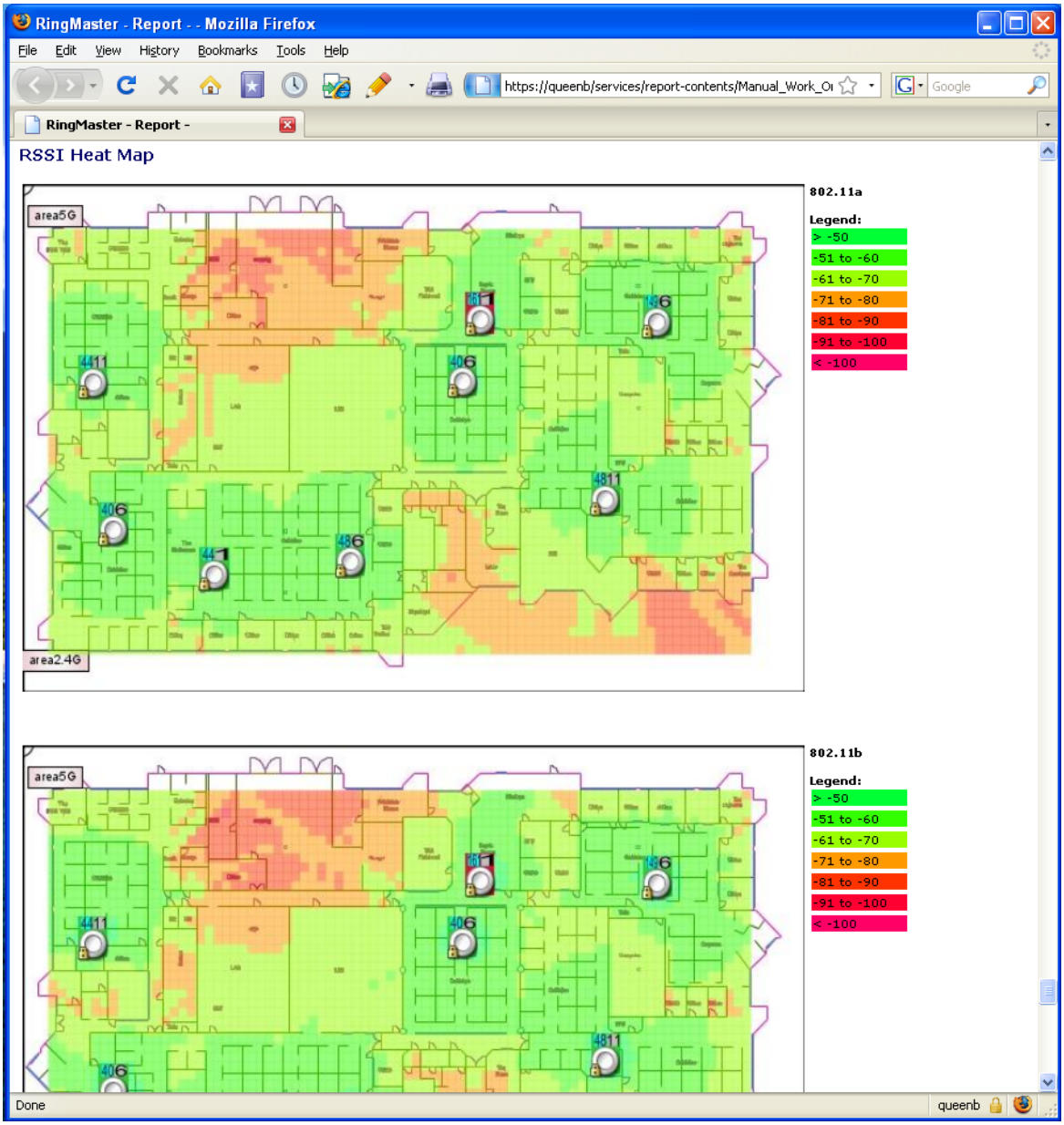
8. Click **Generate** to generate the report.
9. When the report is generated, click the report link to view it in the default browser.



10. You can use links in this window to view desired items.

Work Order Report Changes

Work Order reports include the following new information:

- Power information for MP-432.
- Zone information

Monitoring Requirements for Reports

Some reports require specific monitoring options to be enabled in *RingMaster Services*. **Table 1– 4** lists these requirements for each report type.

Table 1– 4. Monitoring Requirements for Reports

Category	Report	Monitoring Option Requirement
Configuration	Inventory	None. Information comes from the network plan.
	Mobility Domain Configuration	
	MX Configuration	
Client monitoring	Client Summary	Enable **Client Session Collection**
	Client Details	
	Client Errors	
Traffic	Network Usage (Radio Traffic)	Enable Traffic & RF Trending
	Network Usage (Port Traffic)	
RF Information	RF Summary	Enable Traffic & RF Trending and RF Threshold Settings
	Radio Details	
Rogue	Rogue Details	Enable Rogue Detection
	Rogue Summary	
Alarm	Alarm Summary	None. Information comes from SNMP. Traps must be enabled on the MXs and RingMaster Services must be enabled as a trap receiver.
	Alarm History	
	Security	
	Client OUI	
RF Planning	Site Survey Order	None. Information comes from the network plan.
	Work Order	

Viewing Reports

To view or delete saved reports:

1. Select the **Reports** Navigation Bar button.

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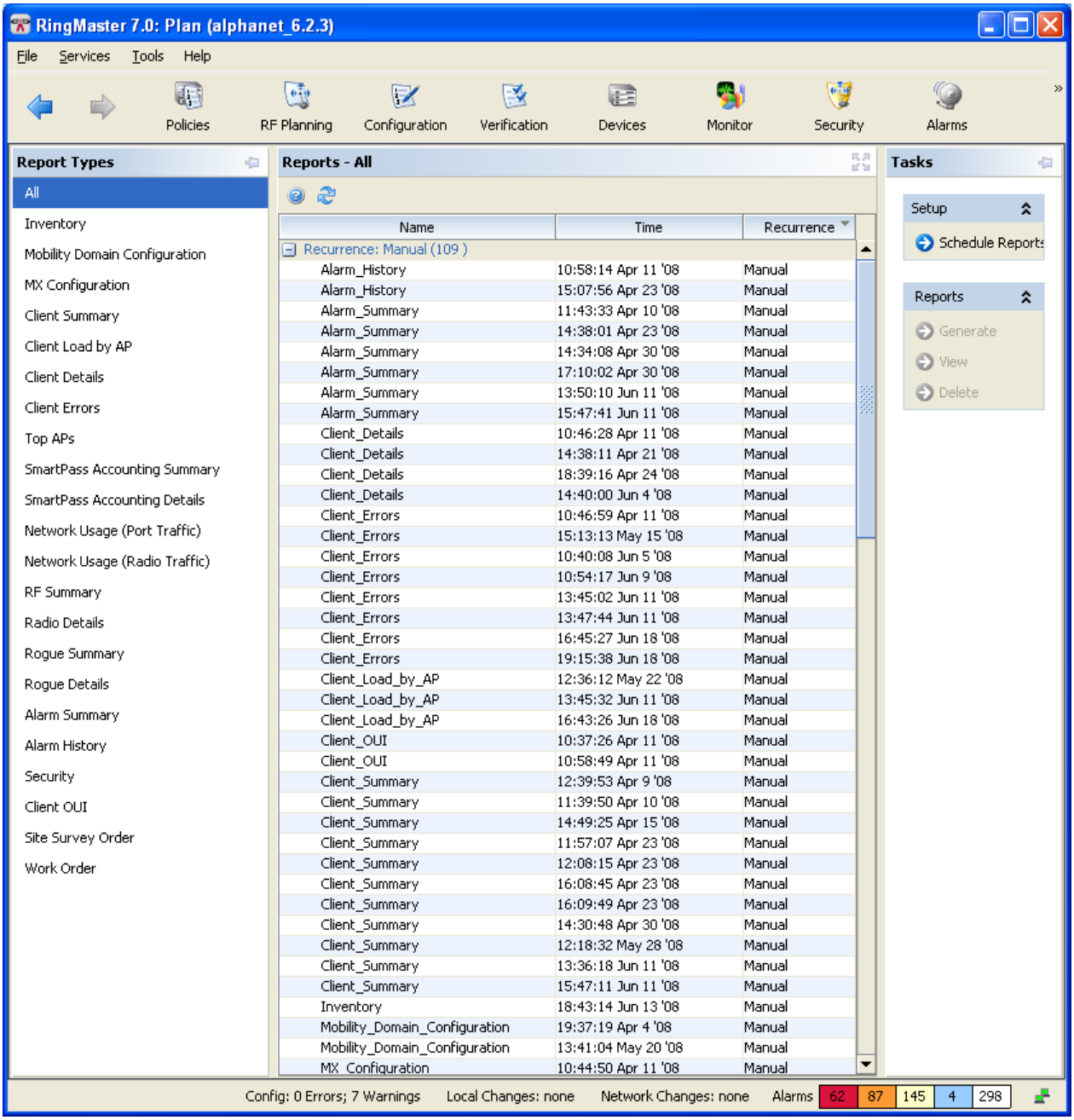
2. In the **Organizer** panel, select **Report Types** to display a list of saved reports. Select **All** in the Organizer panel to display a list of all saved reports.



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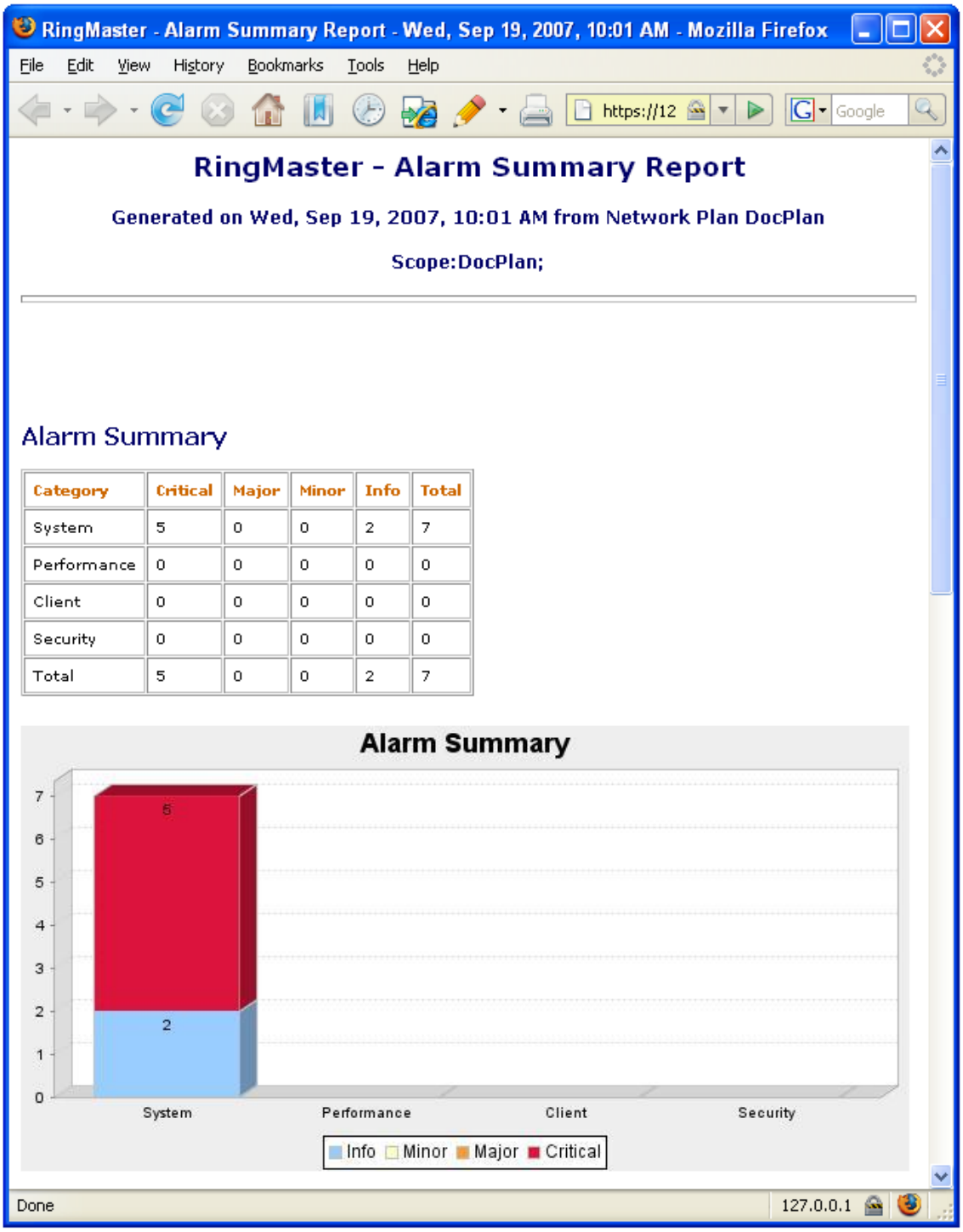
3. Click on a report and click **View** in the **Tasks** panel option list to display the selected report in your default browser.



or

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To delete the selected report from the saved reports directory on the server, select a report and click **Delete** from the **Tasks** panel option list.

Saving a Report

To save a report to your local hard drive:

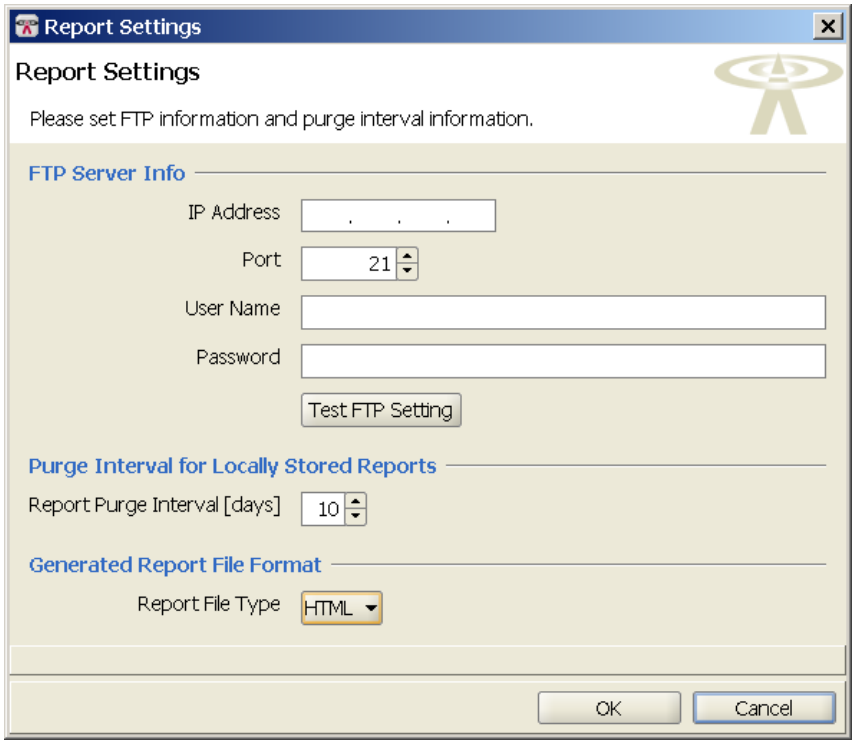
1. Select the **Reports** Navigation Bar button.
2. In the **Organizer** panel, select a **Report Type** to display a list of saved reports. Select **All** in the Organizer panel to display a list of all saved reports.
3. Select a report from the **Saved Reports** panel. (If there are no saved reports, the Content panel displays an empty table.)
4. Choose **Reports > View** from the **Tasks** panel option list to display the selected report in your default browser.
5. Choose **File > Save As...** from the browser menu.
6. Navigate to the directory in which to save the report.
7. To rename the file, enter a new name in the **File name:** field.
8. Select the **Web page, complete** option from the **Save as type:** list.
9. Click the **Save** button to save the report. Images used in the report are saved in a folder named "*reportName*_files" in the directory selected in Step 6.)

To generate an updated report, select an alarm and click **Generate**.

Storing a Report on a FTP Server

To store a report locally or on an FTP server in your network:

1. On the **Reports** page, click **Report Settings**.



2. To configure the FTP Server Info, you need to enter the following information:

- **IP Address** — The IP address of the FTP server
- **Port** — the default port is 21.
- **User Name—** The username to log into the FTP server (if required).

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- **Password** — The password for the FTP server (if required).

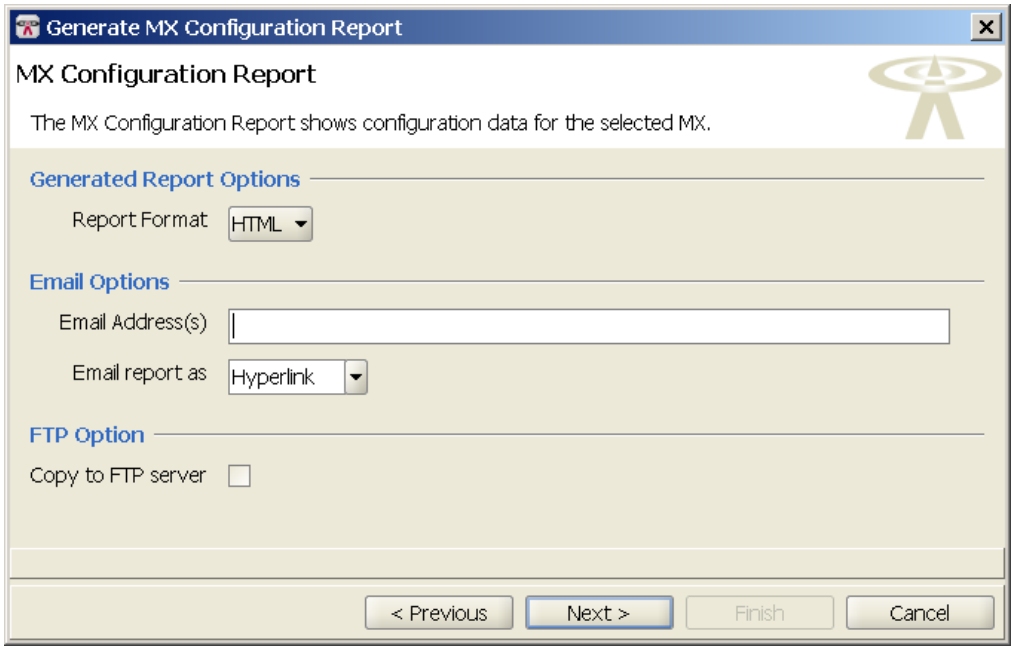
Once you have entered the FTP Server Info, you can test the connection by clicking **Test FTP Setting.**

You can also purge locally stored reports by configuring the interval, in days, to delete them from the RingMaster server. The default value is 10 days.

There are two available formats for RingMaster reports:

- **HTML**
- **PDF**

3. Select the format from the **Report File Type** list.
4. Click **OK** to save the settings.
5. Click **Generate Report** to configure the options for the report format.



Scheduling and E-mailing Reports

Selected network reports can be generated automatically according to a user-defined schedule. Automatically generated reports appear in the Reports panel. When a report is scheduled, you can manage the attributes of the schedule and choose to have it e-mailed to recipients on a mailing list created using the **Schedule** task. You can create different schedules and mailing lists for different reports.

The following reports can be automatically generated and distributed by e-mail:

- **Inventory**
- **Network Usage (Radio Traffic)**
- **Network Usage (Port Traffic)**
- **Alarm Summary**
- **Security**
- **Client OUI**

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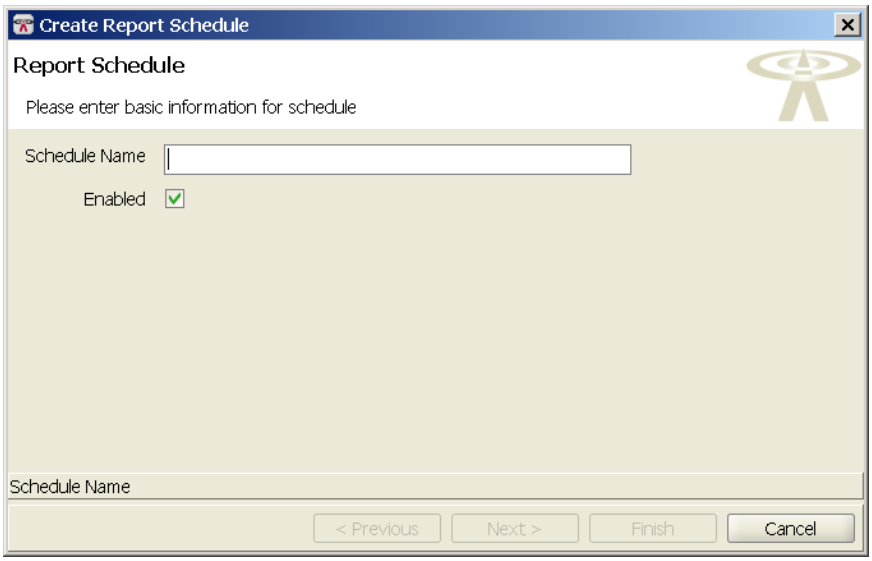
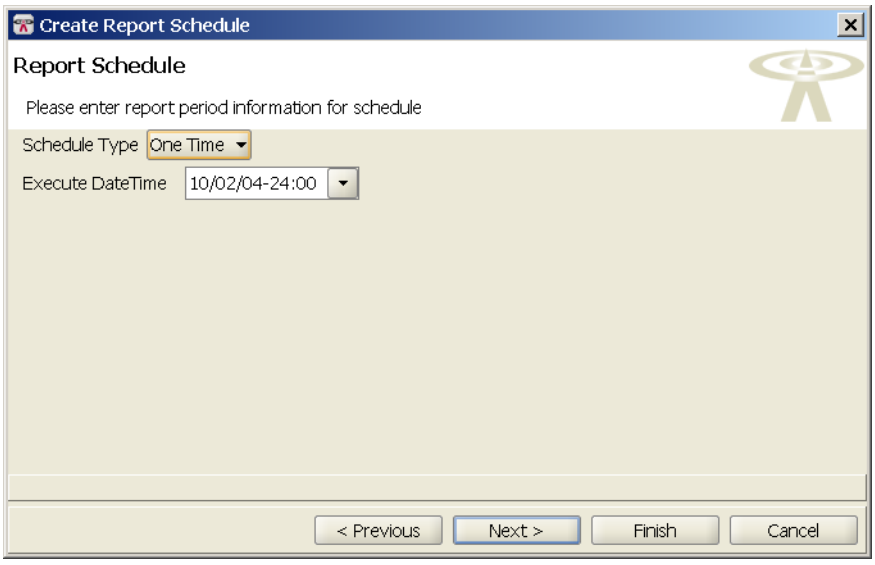
To schedule and e-mail a report:

1. In the **Tasks** panel, under **Create**, click **Schedule**. The **Report Schedule** wizard is displayed.



2. Create a name for the schedule and enter it in the **Schedule Name** field. The report is enabled by default. To disable the Report Schedule, clear the **Enabled** checkbox.
3. Click **Next**.



4. From the **Schedule Type**, select one of the following types:
   - One Time - the Report Schedule runs once at the scheduled time.
   - Recurring - the Report Schedule runs at the designated times.
     If you select Recurring, then you can select specific days and times to run the report as well as the range of the schedule.

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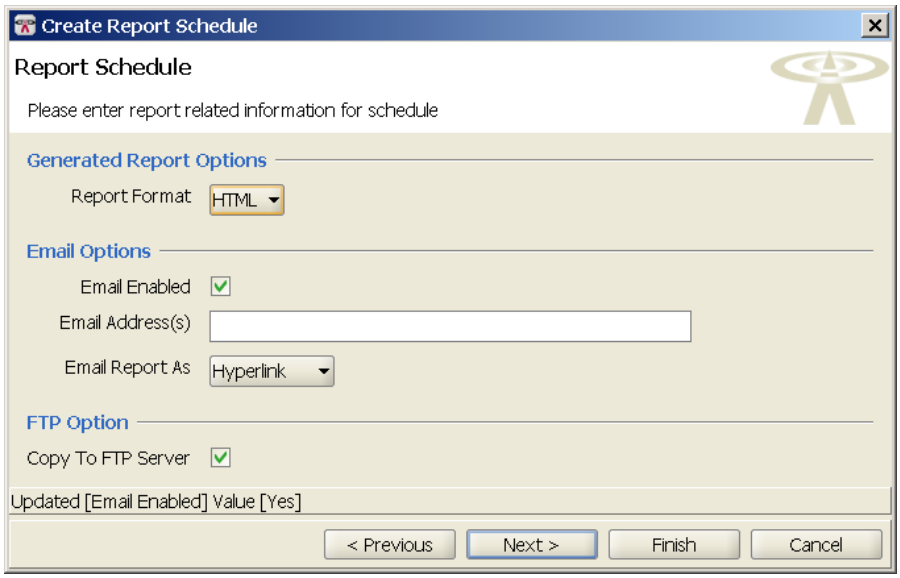
5. Click **Next**.



6. Configure the **Report Type**, either HTML or PDF. If you want the report e-mailed to you, select **E-mail Enabled**, and enter your e-mail address. You can also select the e-mail format for the report, either as a hyperlink or a PDF.

   If you want to copy the report to an FTP server, select Copy to FTP Server.
7. Click **Next**.
8. If you have configured any **Report Definitions**, you can include them here.
9. Click **Finish** to complete the configuration.

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Working with Network Plans

A network plan is identified by a button in the **Organizer** panel of the *RingMaster Client* main window. A network plan is at the top of a hierarchy containing all sites and system elements of a network, each with an icon that allows selection of configuration and operational settings, monitoring, etc. Network elements include MXs, AP access points and optionally, third-party access points. You must create a network plan before you can configure or manage MXs or monitor network data.

A network plan allows modular management of large networks based on organizational or geographical boundaries. For example, a network plan can represent a campuswide network. If you install a license *RingMaster* key for RF planning, you can define a physical representation of network sites, buildings, and floors. You can import drawings of floor plans into a network plan or draw plan details manually. You can identify RF characteristics by importing data from a site survey or manually by identifying RF objects. You should limit a network plan to a single campus or Mobility Domain (Trapeze network domain).

Regulatory limits for 802.11 radios very in different countries. Setting a country code in a network plan enforces appropriate regulatory limits for configured radios. The greatest geographical scope for a network plan is a country, because a network plan is based on one country code.

Managing Network Plans

After creating a network plan, you can save, close, open, or delete it. You can also share a network plan with others.

Saving a Plan

When you create a network plan and save changes, a directory with the same name as the network plan is created in the **config-db** directory of the *RingMaster* installation directory on the *RingMaster Services* host. Each time you save a configuration change, *RingMaster* saves changes to a network plan. You do not need to explicitly save a network plan itself. However, if a network plan has unsaved changes when you select to exit *RingMaster* or close a network plan, *RingMaster* displays a prompt asking if you want to save or discard changes, or cancel the request. (See “Saving or Discarding Configuration Changes” in the publication *RingMaster Configuration Guide*.) (In addition to this section, see “Managing Network Plans” in the publication *RingMaster Management Guide*.)

You should regularly back up the **config-db** directory so that you have additional copies of your network plans.

If a plan has unsaved changes and *RingMaster Services* becomes unavailable before the changes are saved, *RingMaster Client* buffers the changes until *RingMaster Services* becomes available again. However, for the changes to be buffered, you must leave your *RingMaster Client* session open and leave the network plan open.

Saving a Network Plan with a New Name

You can save a network plan with a new name by using the **Save As** feature.

To save a network plan with a new name:

1. Select **Services > Plan Management** to access the **RingMaster Plan Management** page in your default browser.
2. Click **Save As** in the left column to display the **Save As Network Plan** page.
3. In the **Network Plan Name** field, type a name for the network plan. You can use 1 to 60 alphanumeric characters, with no spaces, tabs, or any of the following: slash (/), backslash (\), quotation marks (“ ”), asterisk (*), question mark (?), angle brackets (< >), or vertical bar (|). To place the name of an existing plan into the **Network Plan Name** field, click the button next to the name of the network plan, and then click **Select**.
4. Click **Save** to save the network plan with the new name.

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Opening a Plan

Network plans reside on a system running *RingMaster Services*. You can open an existing network plan by connecting to the *RingMaster Services* host where the plan resides, selecting **Services > Plan Management**, then specifying the name of plan in the **Switch Plan** page. The network plan is then opened in the *RingMaster* main window.

You can open a network plan created in a previous version of *RingMaster* with a later version of *RingMaster*. For example, if you created a network plan in *RingMaster 5.0*, you can open the plan in *RingMaster* . However, because a network plan created in *RingMaster 5.0* manages MXs running *MSS 5.0*, you cannot use new features available in *MSS 7.0* unless you upgrade the MXs to *MSS 7.0*. (To upgrade MXs, see "Distributing System Images" in the publication *RingMaster Management Guide*.)

To open a network plan:

1. Establish a connection to the *RingMaster Services* host on which the network plan is saved. You can do this by restarting **RingMaster** or selecting **File > Connect,** and then entering the IP address of the *RingMaster Services* **host in the RingMaster Services Connection** dialog box.
2. After a connection is established with the *RingMaster Services* host, select **Services > Plan Management** to access the **RingMaster Plan Management** page.
3. Click **Switch Plan** in the left column to display a list of available network plans.
4. Select the network plan you want to open and click **Switch**. If any changes were made to the currently loaded network plan, you are prompted to save them and close the file. The **Switch Network Plan** dialog box appears. *RingMaster* establishes a new connection to the host running *RingMaster Services* and loads the specified network plan.

Importing a Plan

You can import objects from another network plan into the currently open plan. When you import objects from another plan, objects are added to the currently open plan as follows:

- If an object (object name) exists in the plan you are importing but not in the open plan, the object is added to the open plan. If an object (object name) exists in both plans, the copy of the object in the imported plan replaces the object in the open plan.

If both plans have the same floor name, the floor in the plan you are importing completely replaces the floor of the same name in the other plan. You should save a backup copy of the plan before importing objects from another plan. To save a backup copy, use the **Save As** page.

To import a plan:

1. Select **Services > Plan Management** to access the **RingMaster Plan Management** page.
2. Click **Import Plan** in the left column to display the **Import Plan** page.
3. Select the network plan you want to import, from the **Plan** pull-down list. *RingMaster* compares object names in a plan to be imported with object names in the open plan. If both plans have objects of the same name and type, the objects are listed and **Conflict** appears in the **Status** column.
4. Do one of the following, depending on whether you want to import all objects from the plan:
   a. If you do not want to replace the objects in the open plan with their like-named objects in the other plan, click Cancel. RingMaster does not import any objects from the plan.
   b. If you do want to replace the objects, click Import. RingMaster imports the objects into the open plan.

Closing a Plan

You can close a network plan at any time. If you have unsaved changes, you are asked whether you want to save the changes.

To close a network plan:

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1. In the main *RingMaster* window, select **File > Close** or **File > Exit**. If the network plan has no unsaved changes, the network plan is closed. Otherwise, go to the next step.
2. If there are unsaved changes, *RingMaster* displays a dialog asking whether you want to save changes, discard them, or cancel the request to close the plan or exit the application.

   Do one of the following:
   - Select **Apply** to save the changes and close the plan.
   - Select **Discard** to close the plan without saving the changes.
   - Select **Cancel** to cancel the request to close the plan or exit the application, and continue working with the plan.

Deleting a Plan

You can delete a network plan at any time.

You cannot delete the currently active plan. To delete the active plan, first use the **Switch Plan** page to select another plan to be active, then delete the plan.

To delete a network plan:

1. Select **Services > Plan Management** to access the **RingMaster Plan Management** page.
2. Click **Delete Plans** in the left column to display the **Delete Plans** page.
3. Select one or more the network plans from the list.
4. Click **Delete**. The network plan is deleted.

Sharing a Plan

Since the *RingMaster* plan repository resides on a networked server (the host running *RingMaster Services*), you can share access to network plans among hosts running the *RingMaster Client*. When you make changes to a network plan, *RingMaster* locks the portion of the plan you are modifying. Other *RingMaster* clients can open the network plan, but the lock prevents them from modifying the part of the plan you are modifying. The lock remains in effect until your modification is saved. *RingMaster* then removes the lock.

When a user with an administrator or provision account tries to access a part of a plan already locked by another user, *RingMaster* displays a **Lock Info** page. This **Lock Info** page indicates who has locked the network plan. You can optionally override a user's lock. Note that only a user with Administrator privileges can override another user's lock.

To override another user's lock:

1. Select **Services > Lock Management** to access the **RingMaster Lock Information** page. A list of objects that are locked appears.
2. Select the object whose lock you want to delete and click **Delete**. (Only an Administrator can delete a lock.)
3. A message is displayed indicating that the user whose lock you selected cannot save their changes when you delete their lock. Click **Yes** to confirm that you want to do this.

If you override a lock, *RingMaster* unlocks the part of the plan that was locked, and notifies the other *RingMaster* users about the lock change. From this point on, the former lock holder cannot save changes to the previously locked portion of the plan.

By default, *RingMaster* sends a message to all users with the plan open to inform them when changes are saved to a plan. In addition, *RingMaster* sends a message to each monitor user, so that one of them can then edit the plan.

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Configuring AirDefense

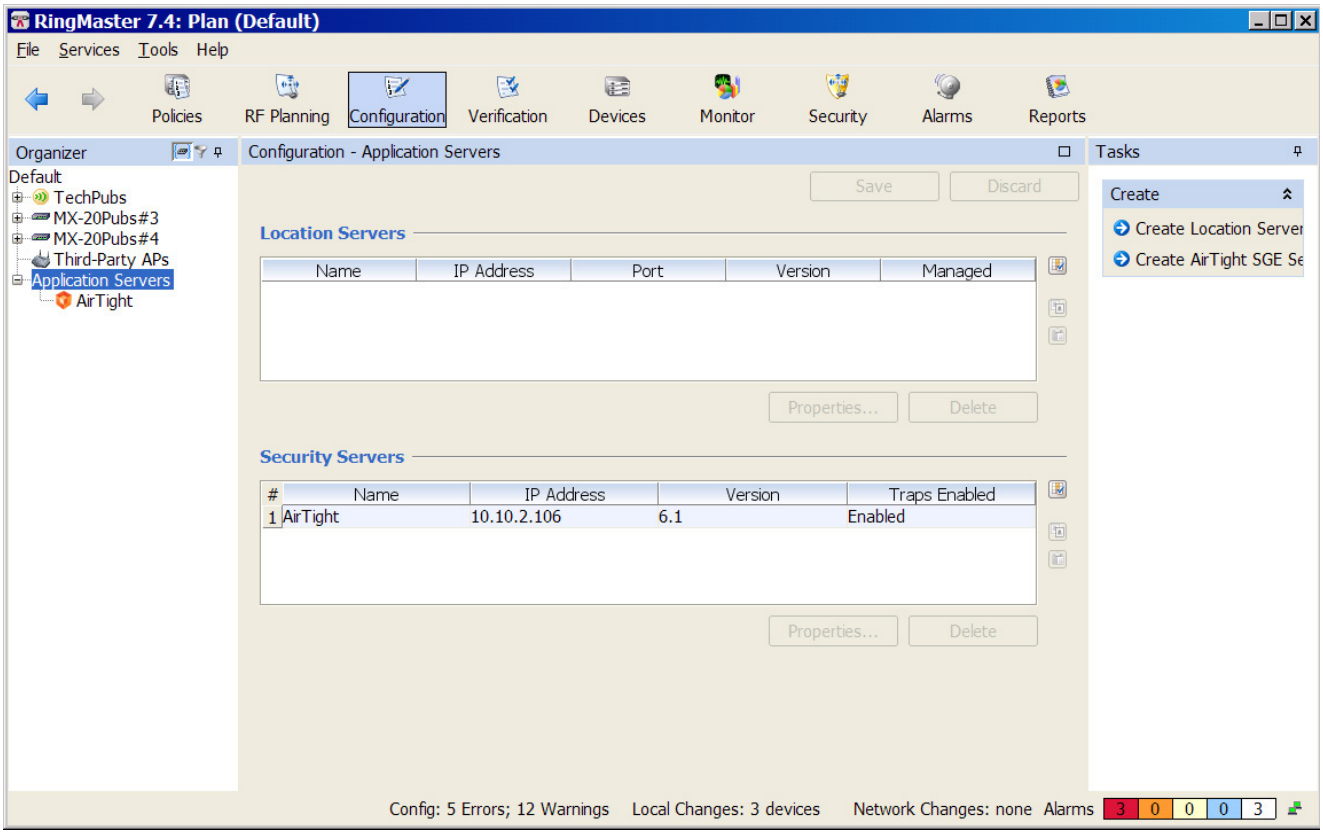
The AirDefense system is an enterprise-class security solution that allows you to protect against threats and intrusions into your wireless network. The AirDefense solution can be integrated with the Trapeze Mobility System, complementing Trapeze network security features by providing a centralized server dedicated to security analysis and record keeping. AirDefense **sensors** constantly monitor a network, relaying information to a central AirDefense **server that** collects and analyzes information. *RingMaster* can be configured to receive alert information from an AirDefense server.

The Trapeze Mobility System integrates with AirDefense security in the following ways:

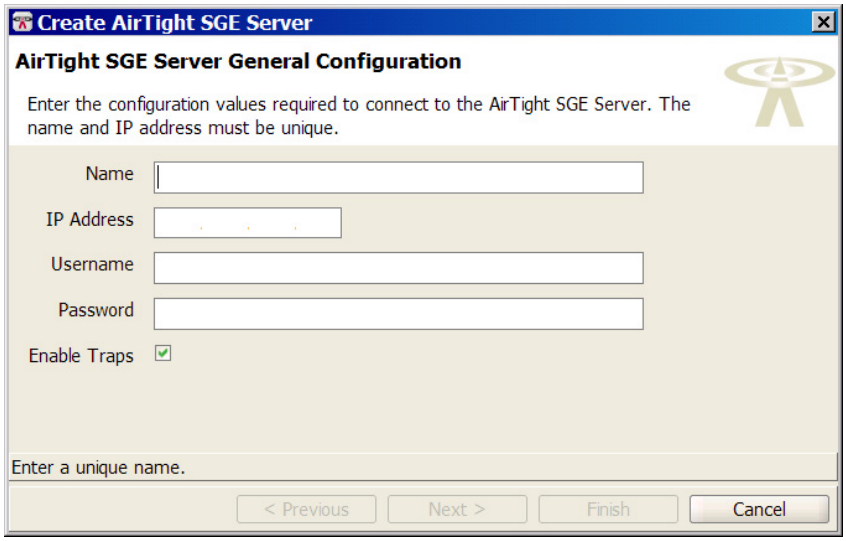
- *RingMaster* can be configured to receive SNMP traps from an AirDefense server. These traps can be correlated to alarms in *RingMaster*, and viewed and managed by clicking the Alarms Navigation Bar button.
- You can access the user interface of the AirDefense server directly from *RingMaster*
- Trapeze Mobility Points can be configured to operate as AirDefense sensors, reporting information about possible threats or intrusions to an AirDefense server

Configuring to Receive Traps from an AirDefense Server

From the Configuration page of RingMaster, highlight Application Servers in the Organizer list.



To add an AirTight server, click **Create AirTight SGE** server located in the Tasks list.



Use the following steps in the wizard to add the server:

1. In the **Name** field, enter the name of the AirTight server.
2. In the **IP Address** field, type the IP address of the AirTight server.
3. In the **Username** field, enter the username with access to the server.
4. In the **Password** field, type the password.
5. If you want to enable SNMP traps for the AirTight server, be sure that **Enable Traps** is selected.

Launching the AirDefense Server User Interface

1. Select the **Configuration** Navigation Bar button.
2. In the **Organizer** panel, select a network plan name.
3. In the **Tasks** panel, select **Launch AirDefense UI**. A Web browser opens and establishes a connection to the AirDefense server specified in the **Set Up AirDefense** wizard.

A connection is established only if you had previously specified the IP address of an AirDefense server in the **Set Up AirDefense** wizard.

Converting APs to AirDefense Sensors

1. Select the **Configuration** Navigation Bar button.
2. In the **Organizer** panel, select the network plan name.
3. In the **Tasks** panel, select **Create AirDefense Sensor**. The **Create AirDefense Sensor** wizard appears.
4. Click **Next**. **Transfer AirDefense Sensor Image** page appears. On the **Transfer AirDefense Sensor Image** page, you specify an AirDefense sensor software file to be transferred to one or more MXs. The AirDefense sensor software file is software that runs on an AP and allows it to operate as an AirDefense sensor. After AirDefense sensor software file is transferred to an MX, the file can be sent to one or more of the DAPs managed by the MX.
5. To transfer an AirDefense sensor software file, click **Select a File** and specify a file to be transferred. Regardless of the name of the file you choose, it will be saved on the MXs with the name **adconvert.bin**.

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6. From the **MX** List, select each of the MXs you want to transfer the AirDefense sensor software file to, then click **Start Transfer**. The AirDefense sensor software file is transferred to selected MXs.
7. After transfer is completed, click **Next**. A list of DAPs managed by MXs appears.
8. Select APs you want to convert to AirDefense sensors and click **Next**. A page indicating progress appears.
9. After the DAPs have been converted to AirDefense sensors, click **Finish**.

Specifying the AirDefense Server as a Trap Receiver on MXs

MXs in a network plan must be configured with the AirDefense server as a trap receiver for AP traps. To do this, perform the following steps for each MX:

1. Create a notification profile. See “Configuring a Notification Profile” in the publication *RingMaster Configuration Guide* for configuration steps. In a notification profile, the AP traps **APNonOperStatus** and **APOperRadioStatus** must be enabled.
2. Create a notification target. See “Configuring a Notification Target” in the publication *RingMaster Configuration Guide* for configuration steps. Enter the AirDefense server address in the **IP Address** field. From the **Notification Profiles** list, select the notification profile you created in step 1.

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